

# 60% PRELIMINARY PLANS

ALL INFORMATION CONTAINED WITHIN  
  
IS TO BE CONSIDERED PRELIMINARY

# NOT FOR CONSTRUCTION

# US-191 Over the Colorado River Bridge Replacement Project

Moab, Utah

# Welcome / Introductions



# Meeting Details

- **Sign-In**
- **Agenda**
- **Microphones**
- **Tables, Displays, Materials**
- **Refreshments**





# Project Team

- **Utah Department of Transportation**
- **Consultants**
  - **FIGG** (PM, Bridge Design)
  - **Lochner** (Civil, Roadway, Utilities, Drainage, Hydraulics, Environmental, Walls)
  - **RB&G** (Geotech, Survey, ROW)
- **Stakeholder Group**



# Project History

- **Prior to 1912 – Ferry Service**
- **1<sup>st</sup> Bridge – 1912, 3-Span Truss Upstream**
- **2<sup>nd</sup> Bridge (Existing) – 1955, Steel Plate Girders**
- **Proposed Bridge 3<sup>rd</sup> Crossing**



# Project History

- **Replacement of Existing Bridge C-285**
  - Functionally Obsolete
  - Outdated Structural Details
  - Scour Mitigation Project
    - AJAX
    - Column / Footing Repairs
  - Pedestrian Bridge
- **Consultant Services**
  - Environmental Assessment
  - Design – August 2007



# Project Timeline

- **60% Plans** May 2008
- **PS&E Plans** August 2008
- **Advertisement** October 2008
- **Project Award** Nov/Dec 2008
- **Construction (2.5 to 3 yrs.)** 2009 - 2011





# Project Overview



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**UTDOT**  
CONNECTING COMMUNITIES  
Region 4

# Aerial





# Aerial Site Map





# Site Photo





# Site Photo





# Site Photo





# Site Photo





# Site Photo





# Site Photo





# Site Photo





# Site Photo





# Site Photo





# Site Photo





# Site Photo





# Site Photo





# Limits

- **Study Corridor**
  - 400 North in Moab to Potash Road
- **Construction Limits**
  - Courthouse Wash to S. of Moab Valley RV





# Bridge



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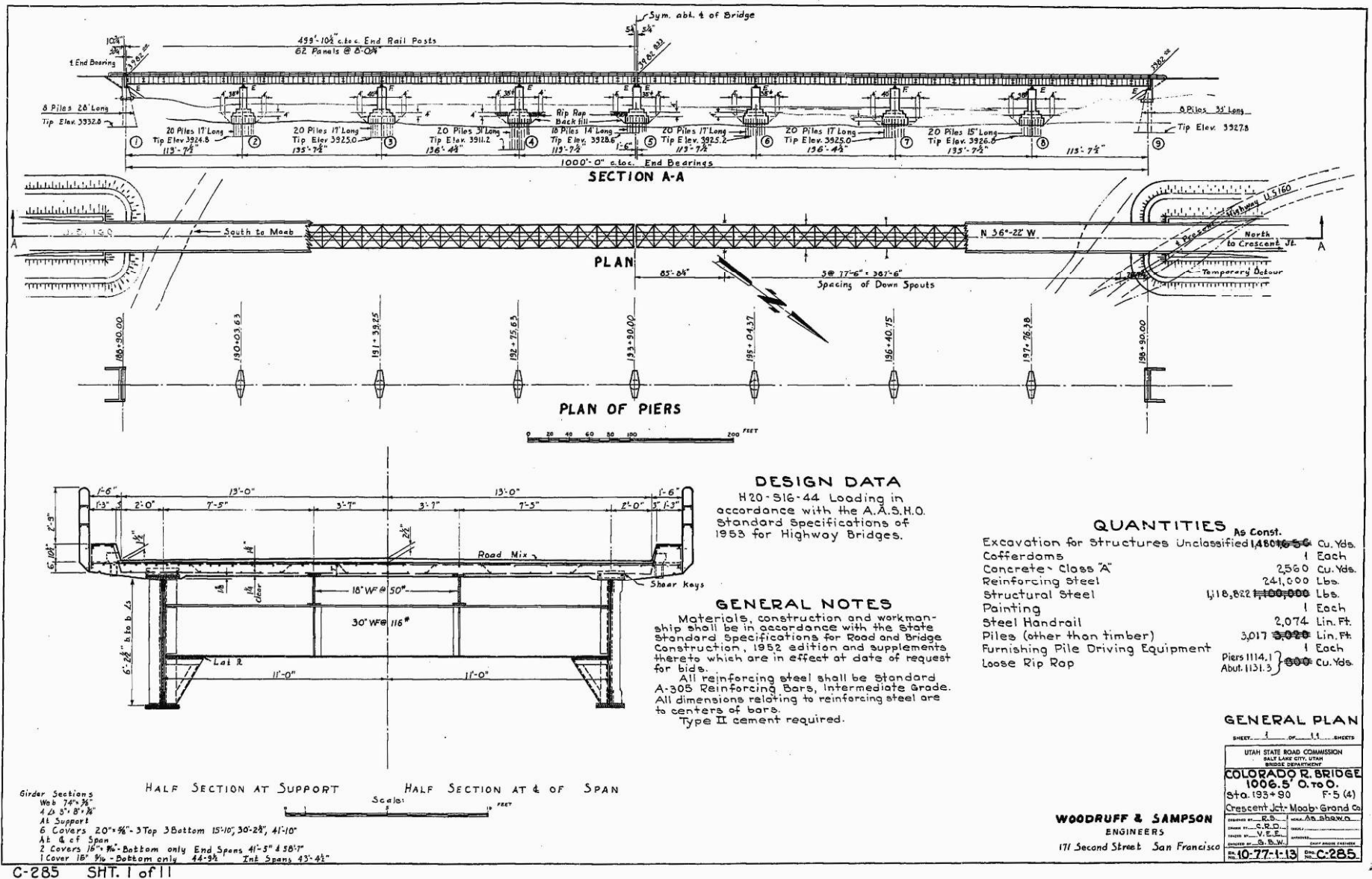
# Bridge

- Existing Conditions
- Project Goals & Considerations
- Proposed Section & Alignment
- Bridge Layout
- Substructure & Superstructure Details
- Construction

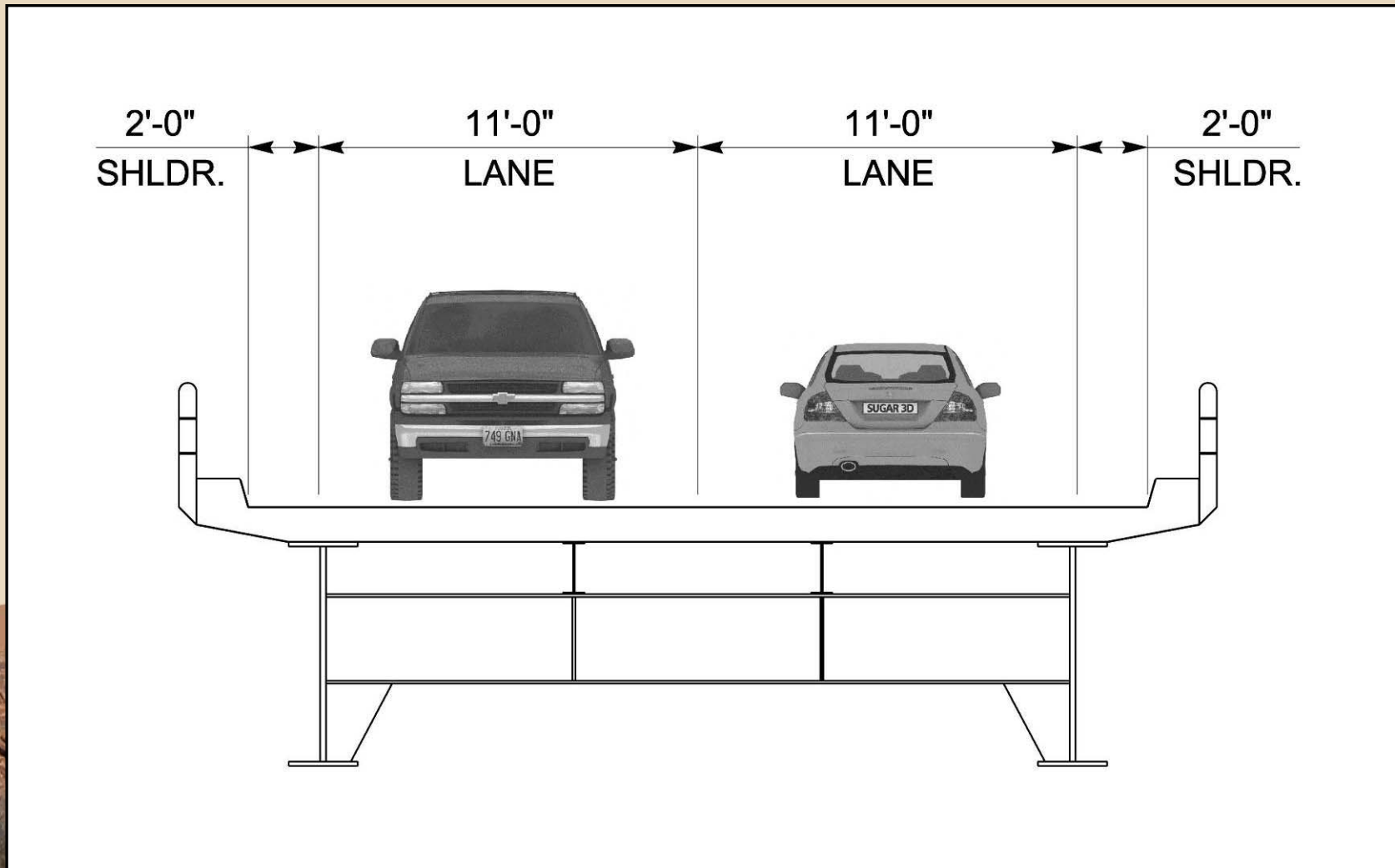




# Existing Conditions



# Existing Conditions





# Project Goals

- **Increase Capacity**
- **Improve Safety (motorists, bicyclists, pedestrians)**
- **Provide Higher Level of Service**
- **Blend with the Unique Surroundings**
- **Aesthetics**



# Project Goals

- **Minimize River, Environmental Impacts**
- **Enhance Trail Network**
- **Minimize ROW, MOT**
- **Stakeholder, Community Involvement**





# Considerations

- **City, County Coordination**
- **Utilities**
- **Property Owners, Access and Operations**
- **Phasing / MOT**
- **River and Recreational Impacts, Use**
- **Access and Staging**



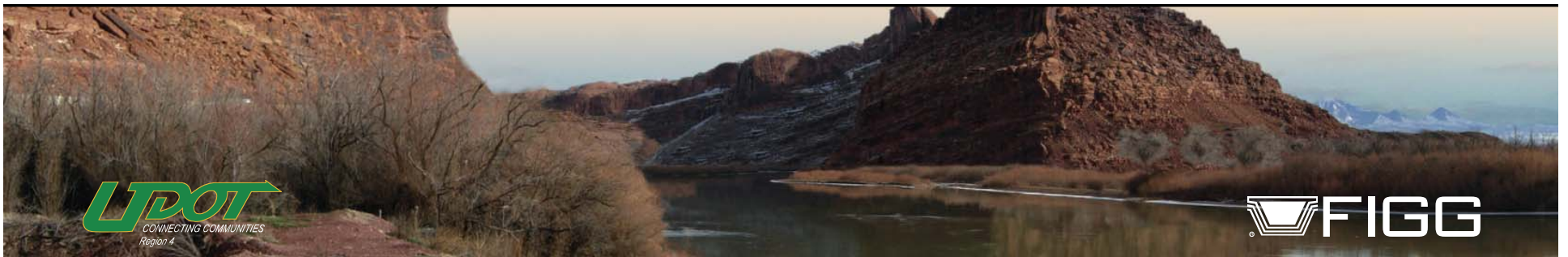
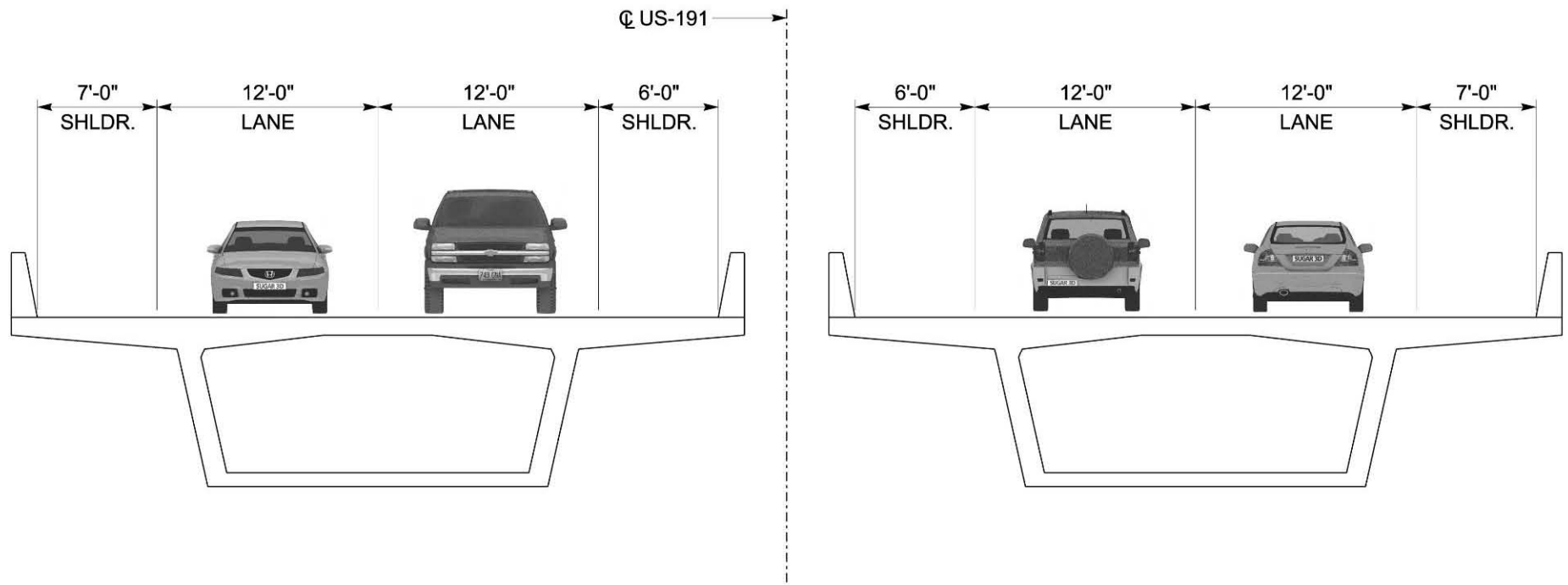
# Considerations

- **River Access (Pier 3)**
- **EA Compliance**
  - River Disturbance
  - Moab Events
  - Permit Requirements
  - Native Species
  - Other

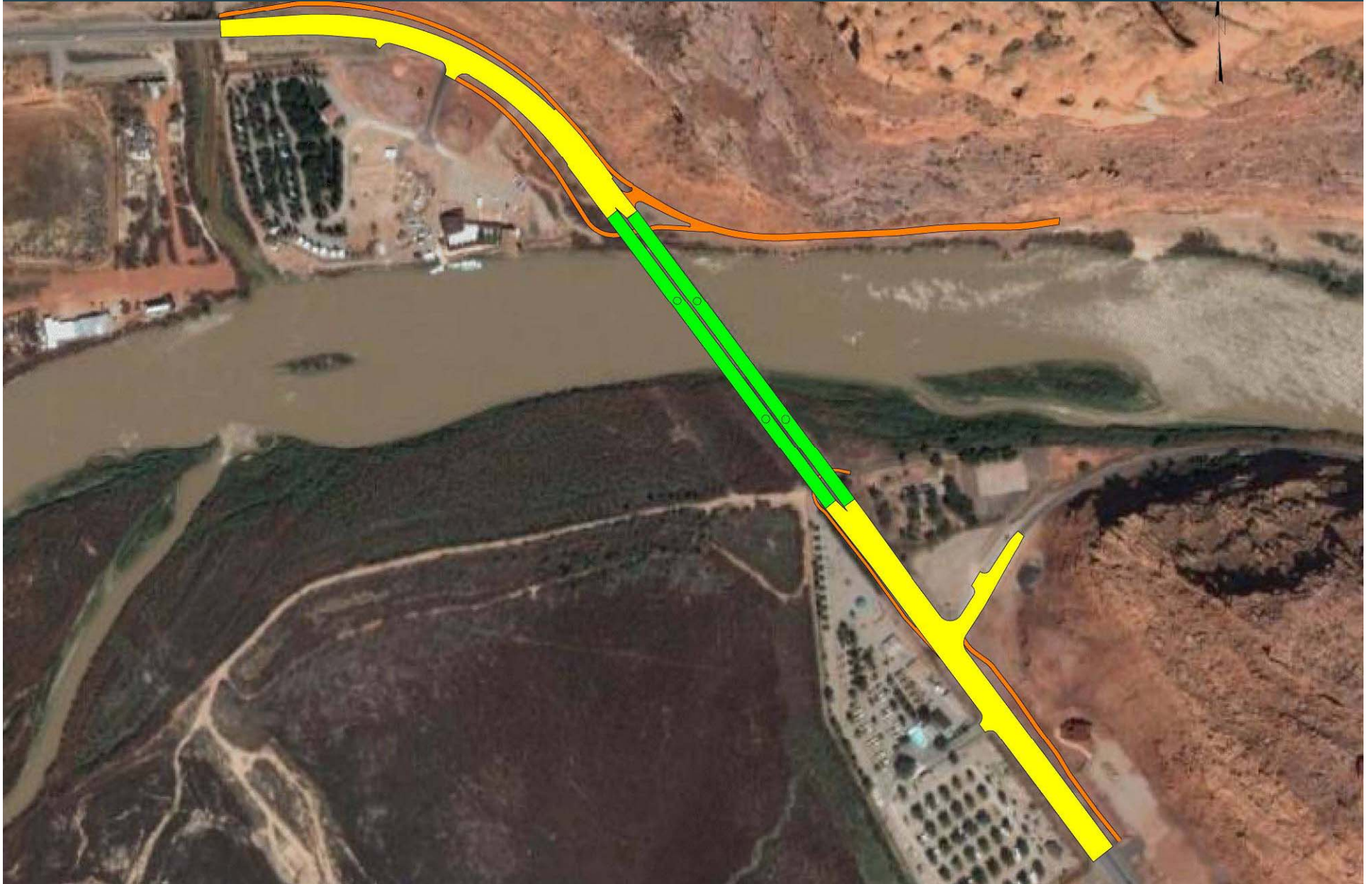




# Proposed Roadway Section

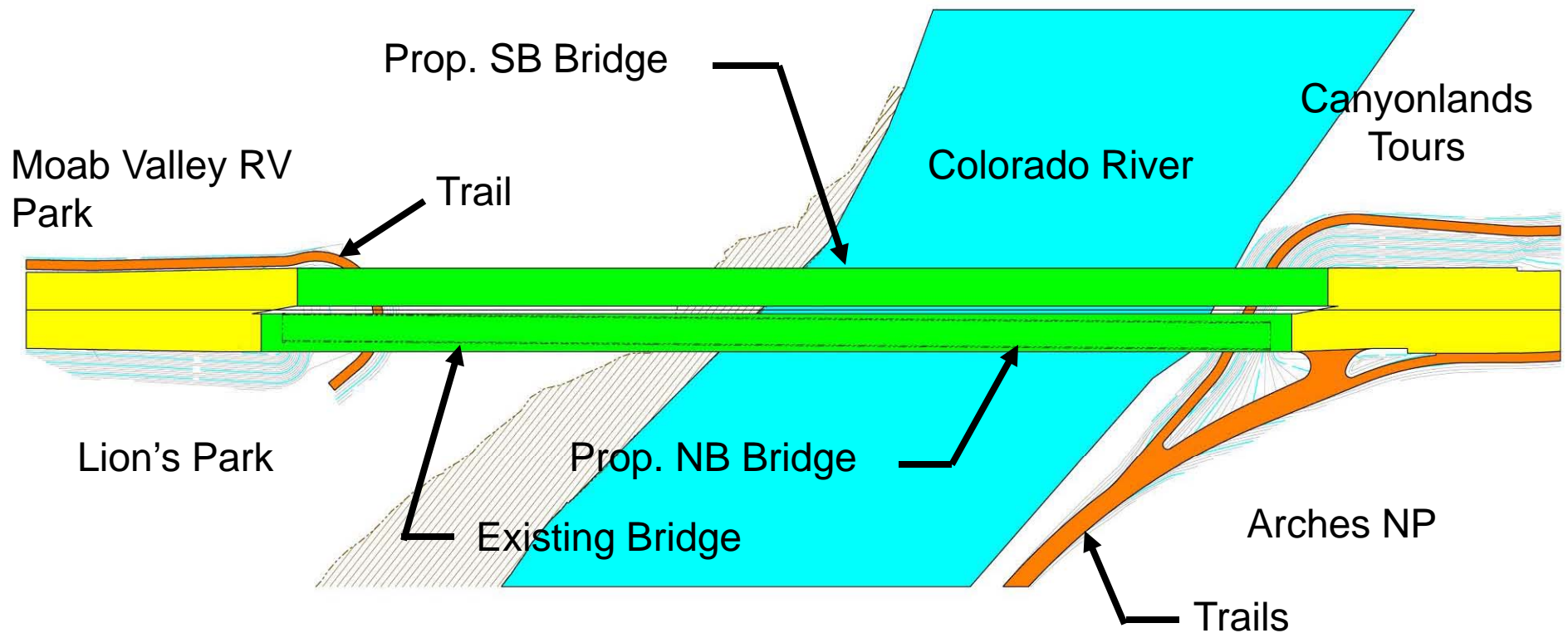


# Proposed Alignment - Aerial





# Alignment



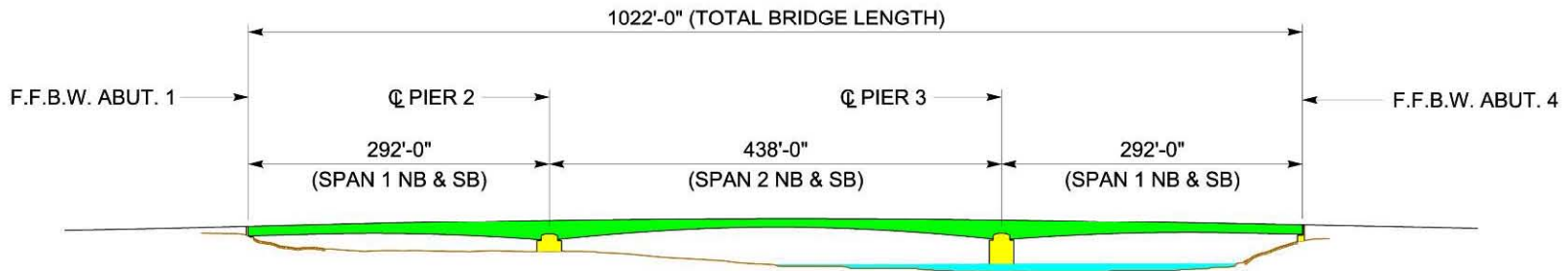
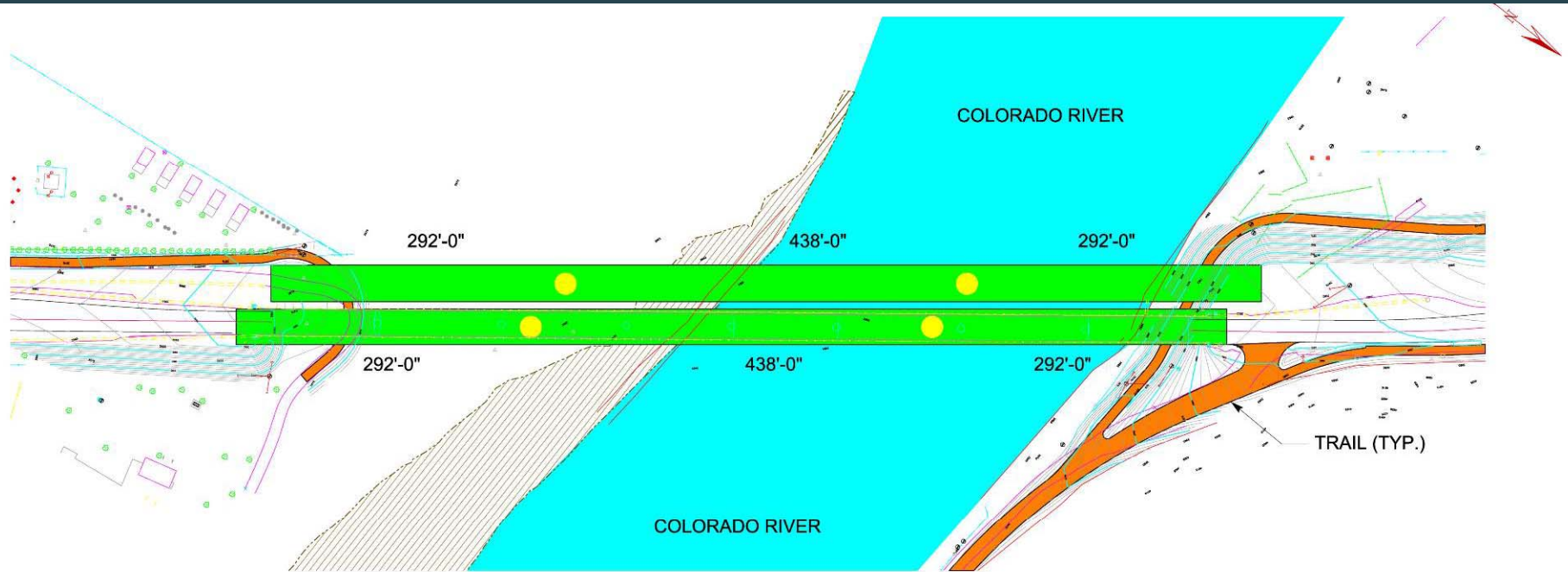
# Bridge Layout

- **Twin Structures:** 1022' Long
- **Deck Width:** 39'-10" (each)
- **Structure Depth:** Varies
- **Expansion Joints at Abutments**
- **Bearings at Piers and Abutments**
- **Final Riding Surface:** 2.5" Integral Concrete Overlay

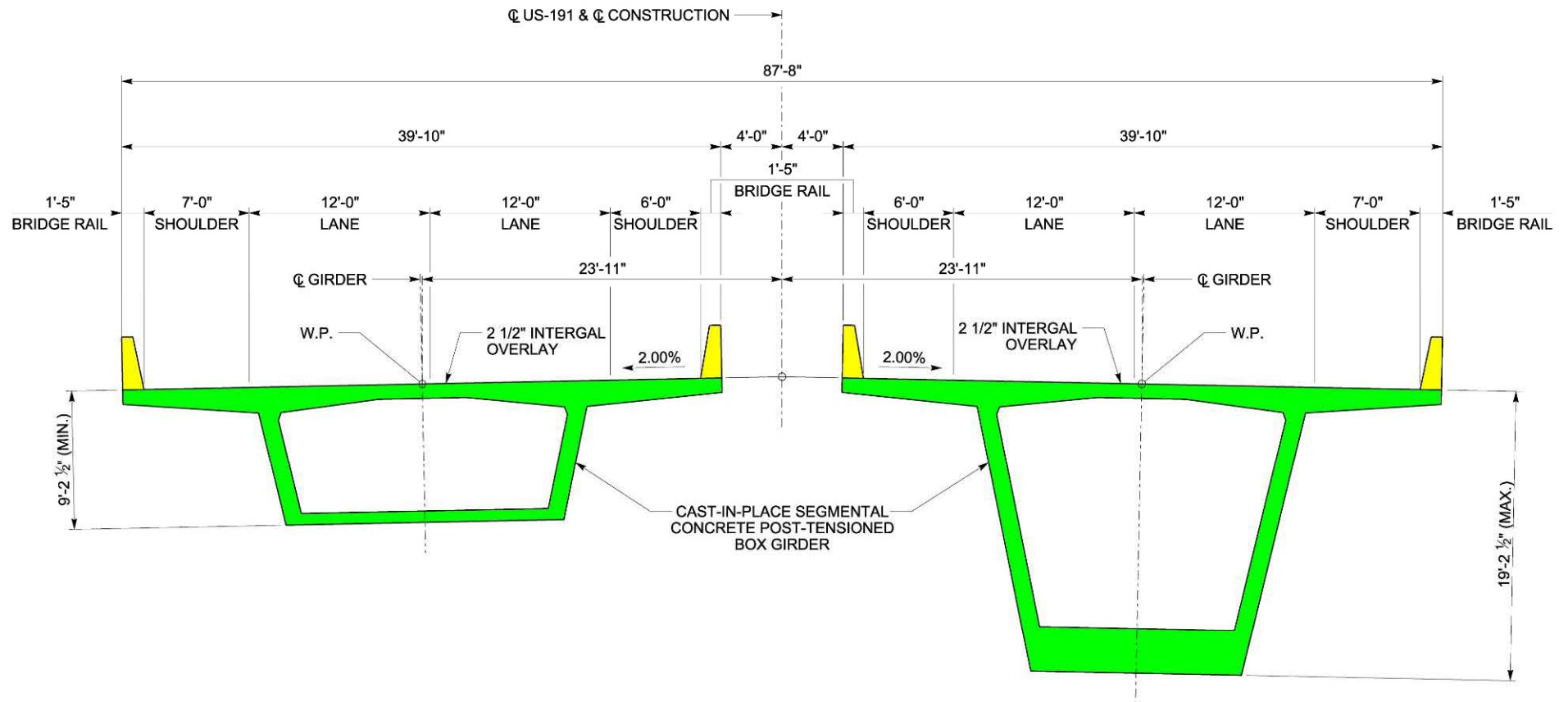




# Bridge Layout



# Bridge Layout



MINIMUM DEPTH SECTION

MAXIMUM DEPTH SECTION



# Bridge Rendering



# Bridge Rendering





# Bridge Rendering



# Substructure

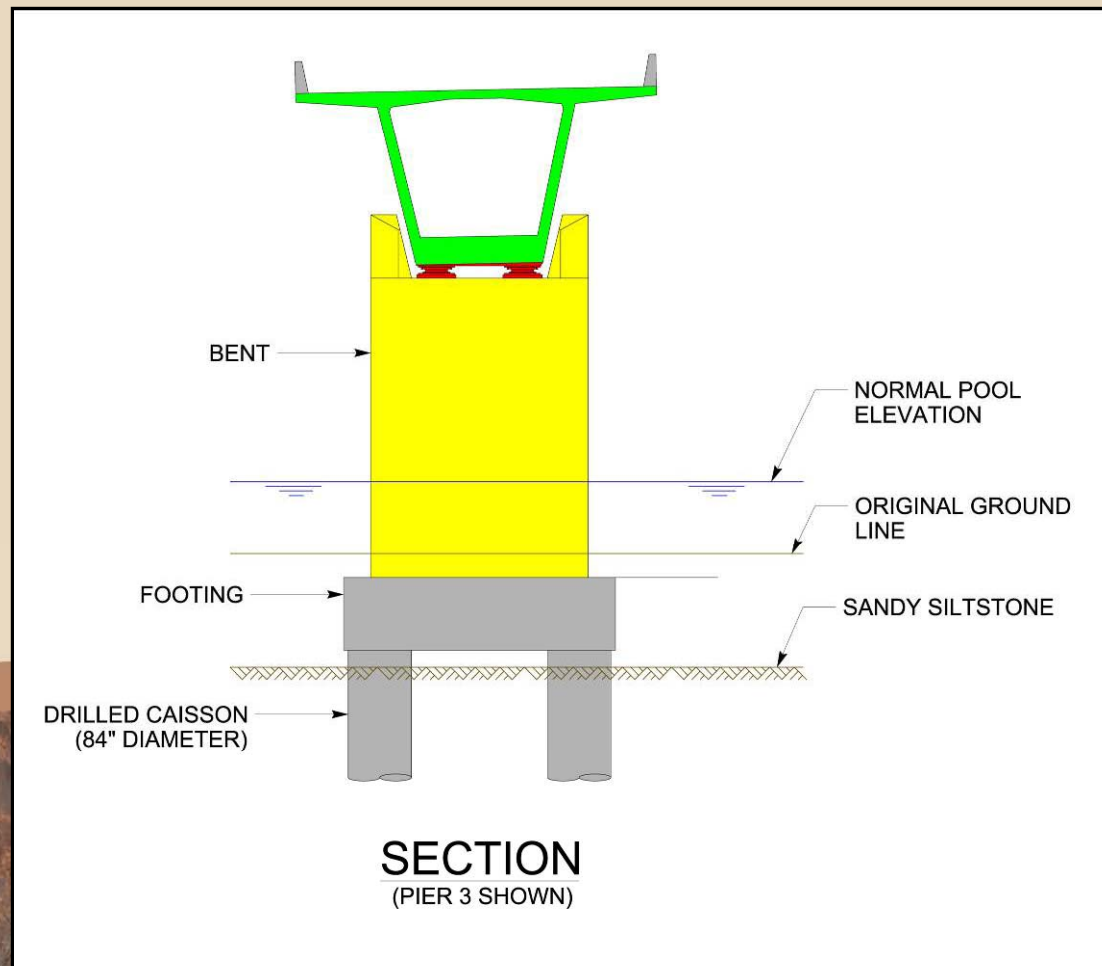


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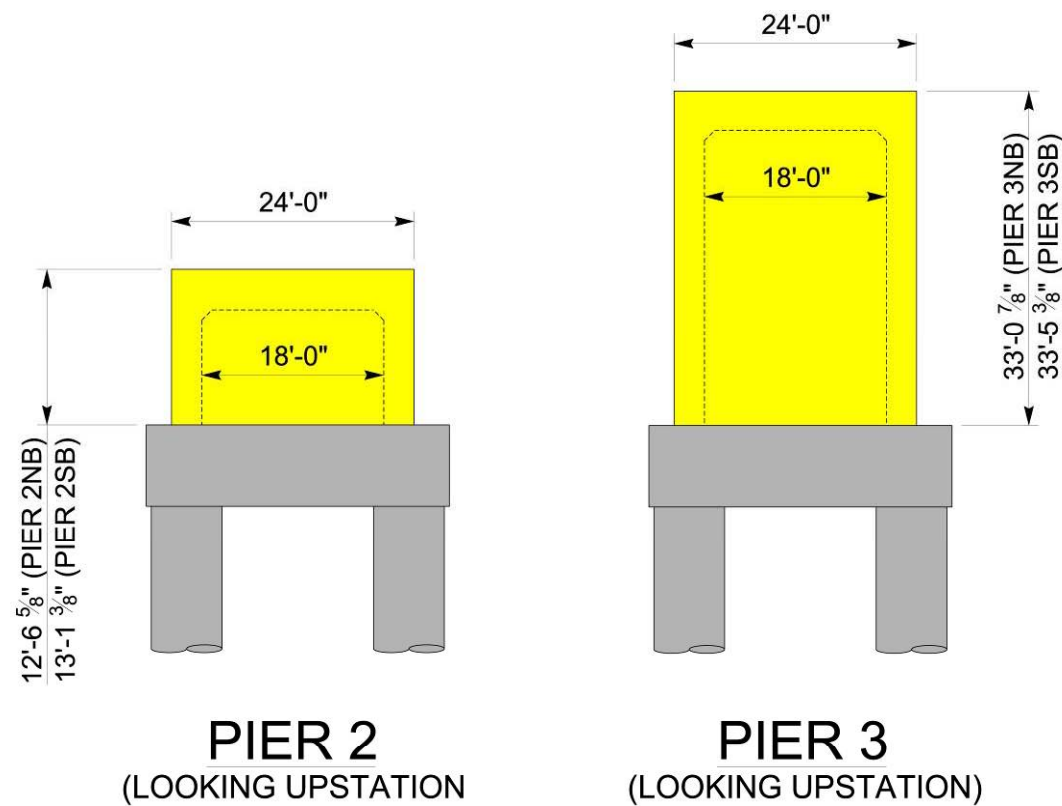


# Substructure



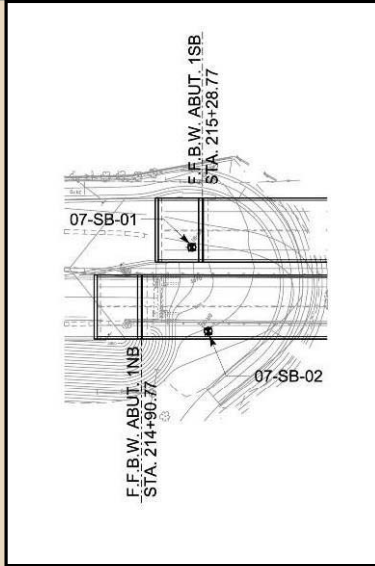
# Columns

- Hollow Circular Cross Section
- Filled with UDOT Flowable Fill

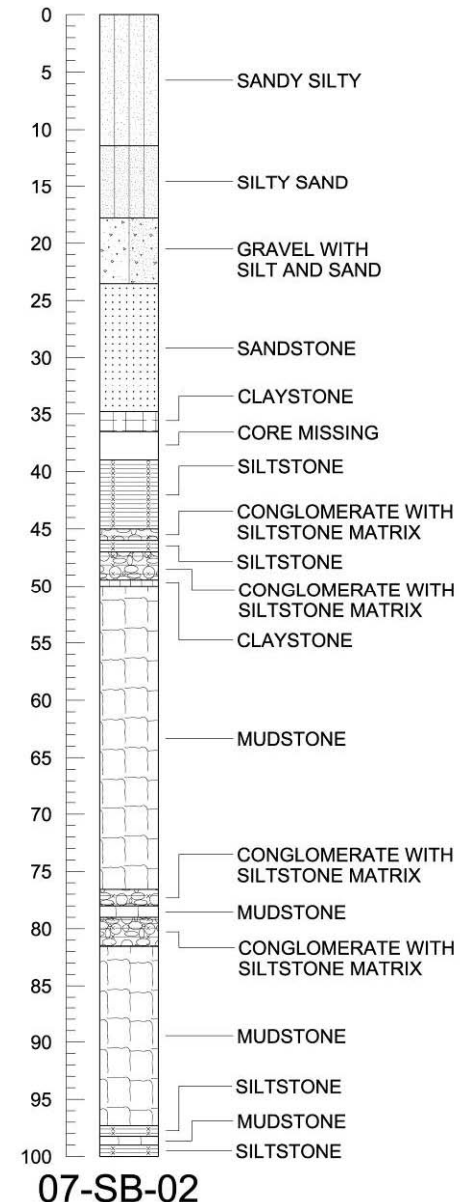
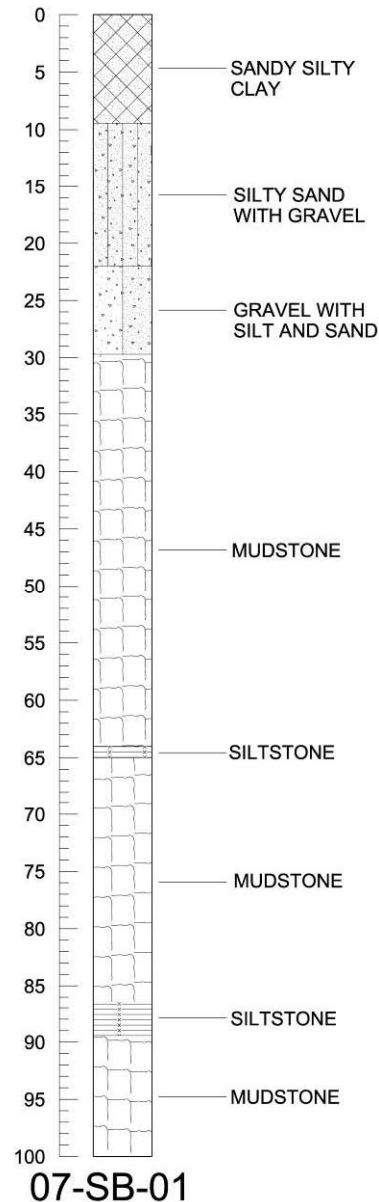




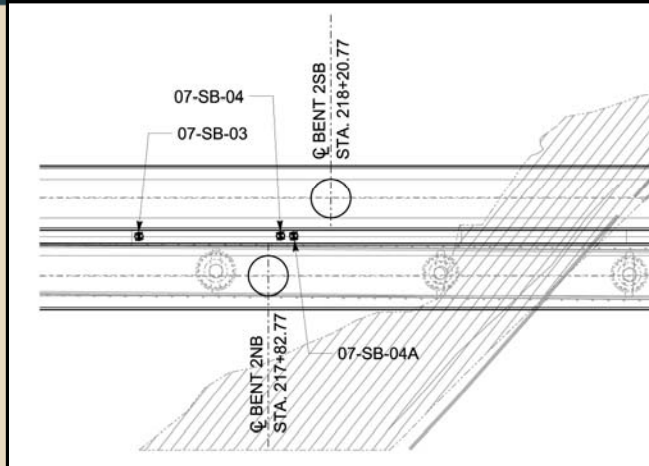
# Subsurface – Abutment 1



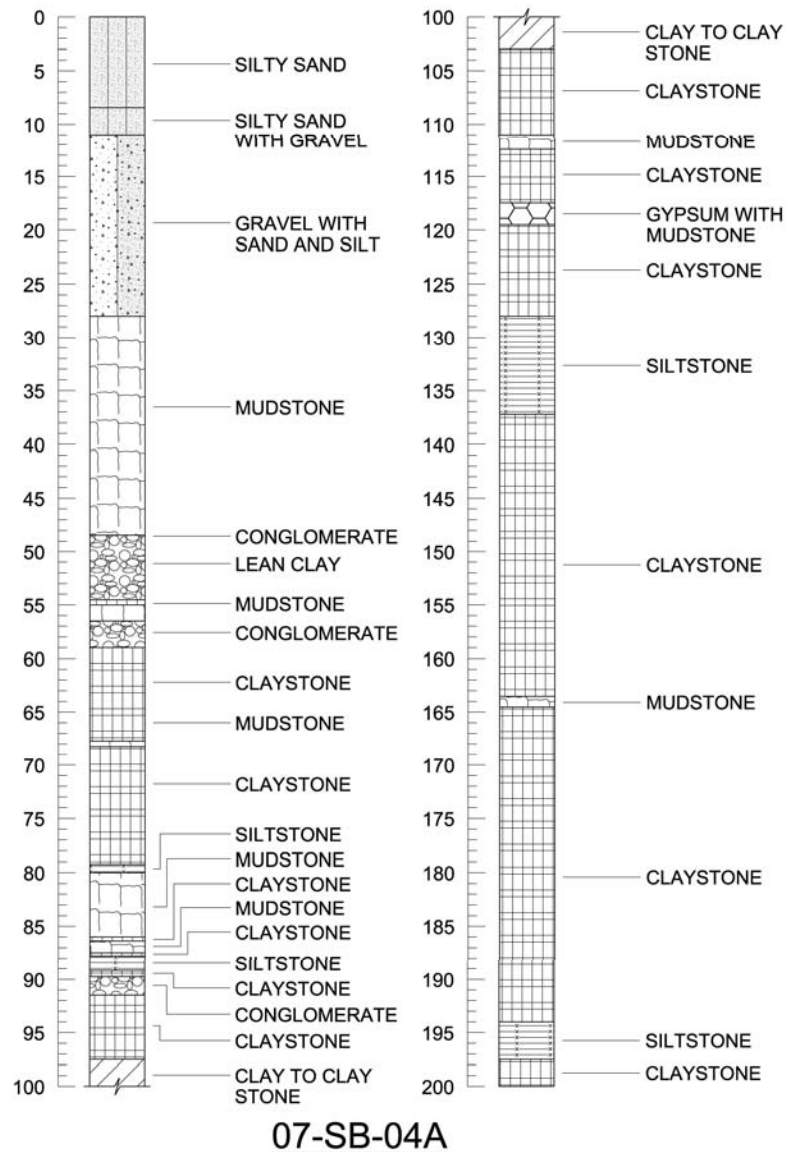
Mudstone, Siltstone



# Subsurface – Pier 2



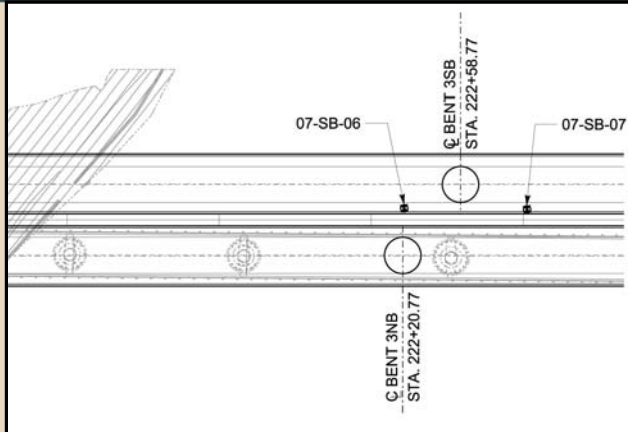
Mudstone, Siltstone



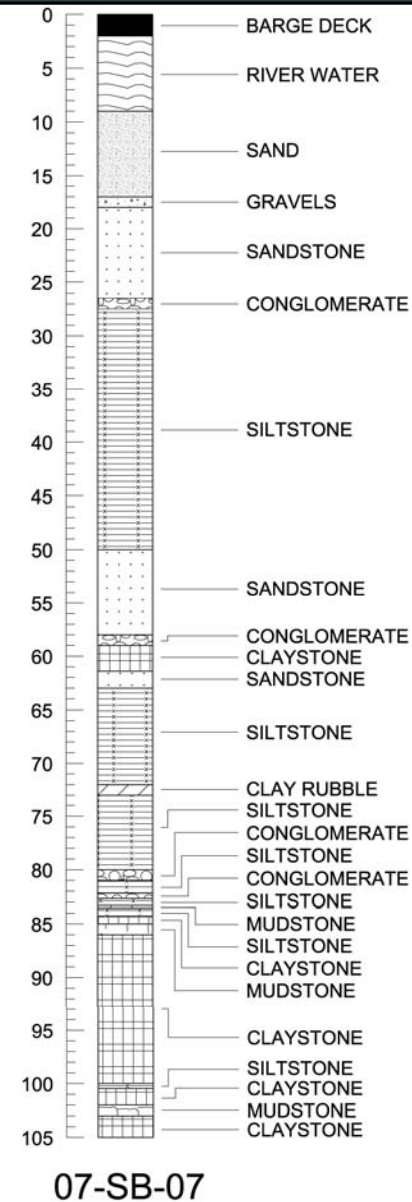
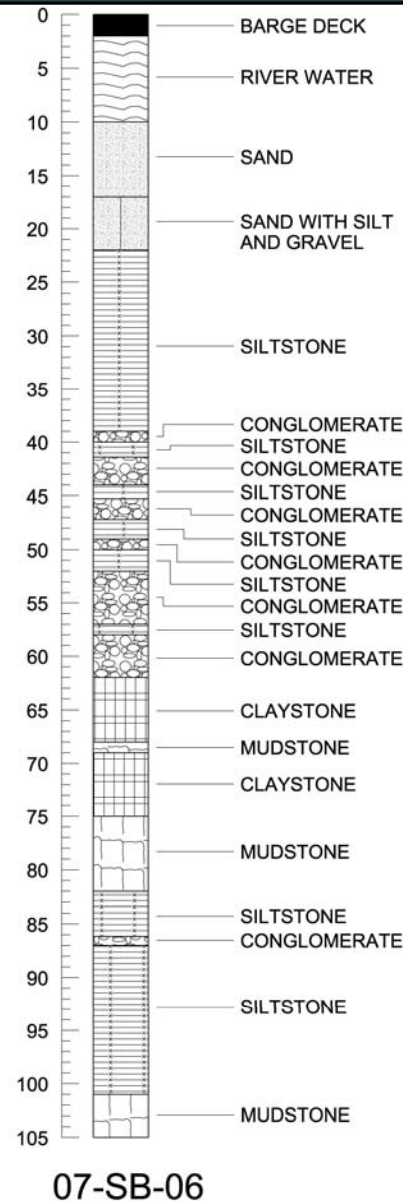
FIGG



# Subsurface – Pier 3

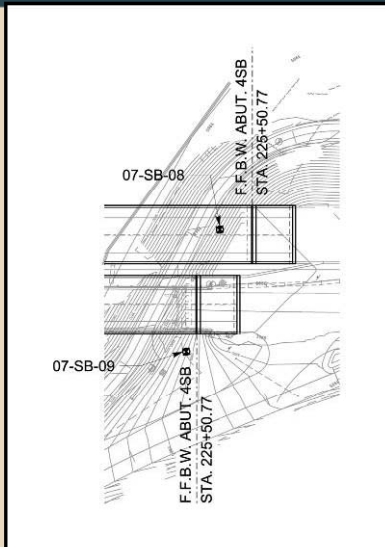


Claystone, Mudstone, Siltstone,  
Sandstone

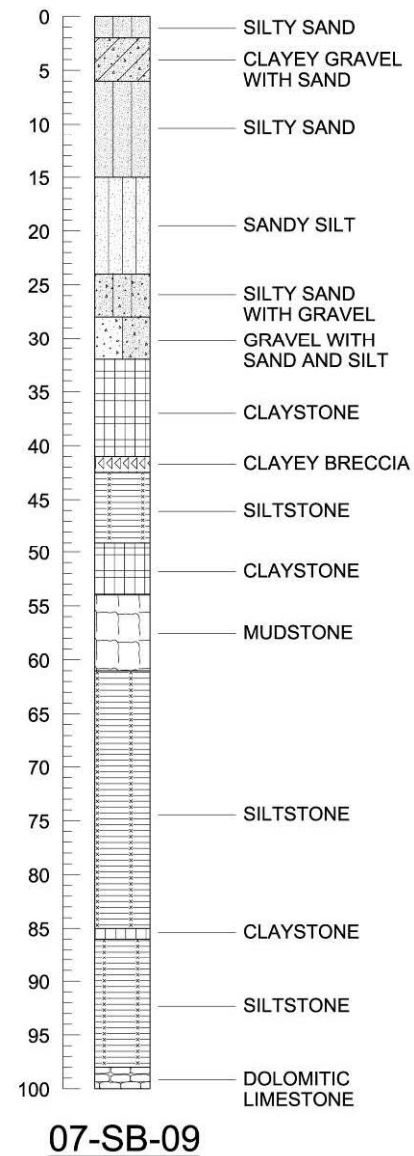
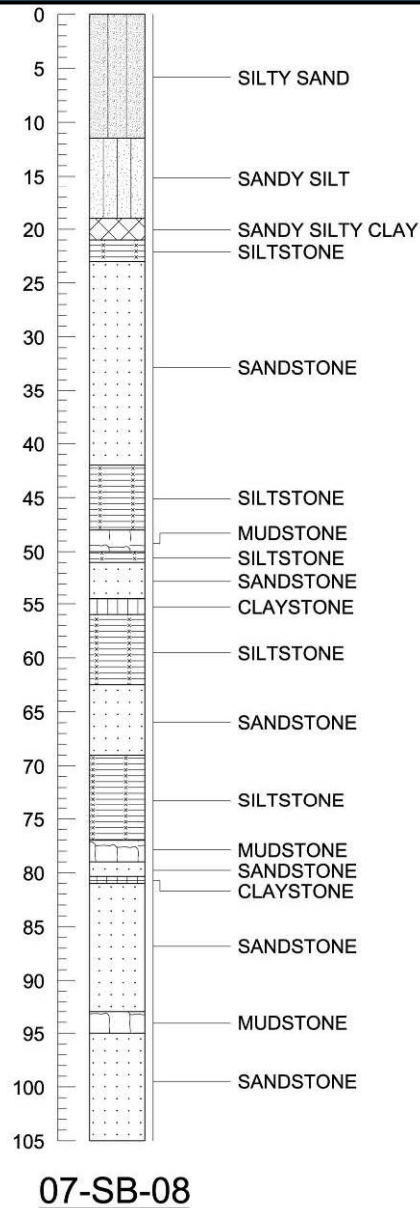


FIGG

# Subsurface – Abutment 4



Claystone, Mudstone,  
Siltstone, Sandstone



FIGG



# Drilled Shafts

- **Piers**
  - 7'-0" Diameter (4 per Pier)
  - Pier 2 Length = 149'
  - Pier 3 Length = 94'
- **Abutments**
  - 5'-0" Diameter (2 per Bridge Abutment)
  - Abut. 1 Length = 96'
  - Abut. 4 Length = 65'



# Drilled Shafts

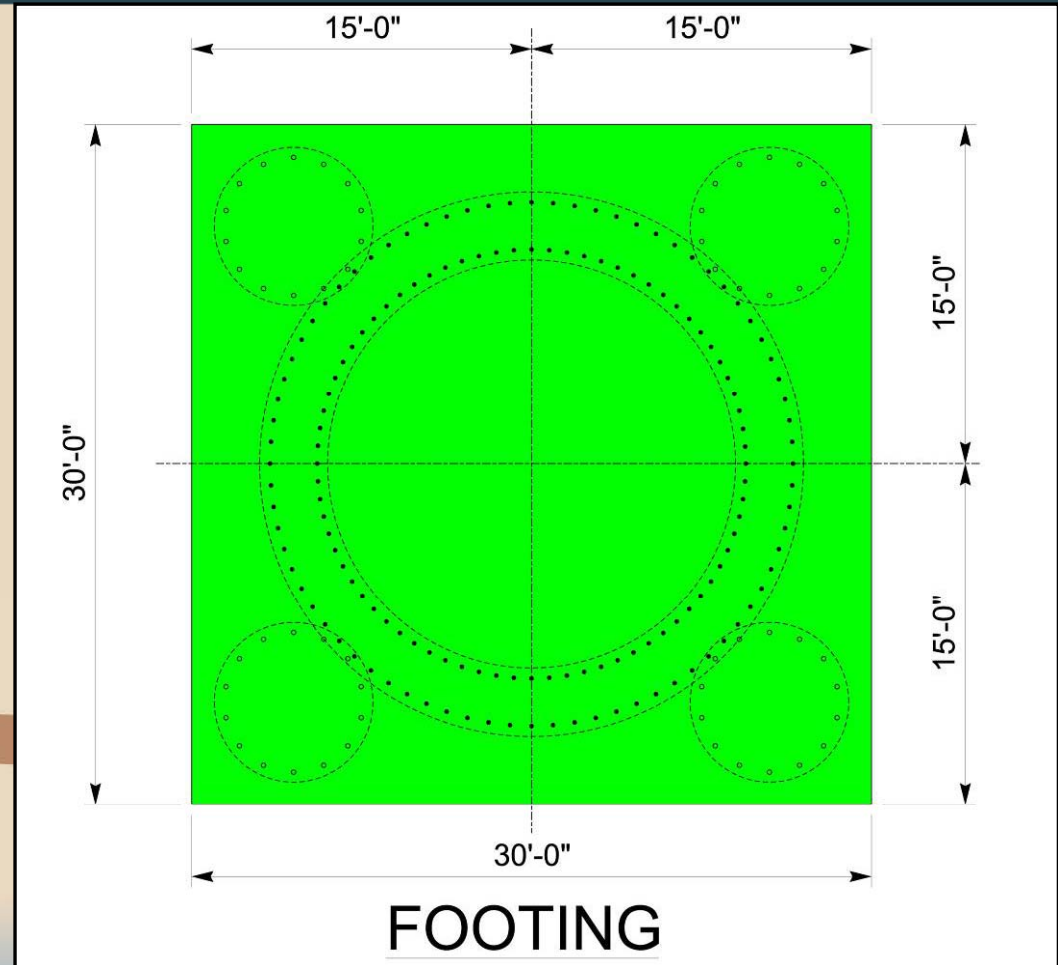
- **Water Level, Fluctuation**
- **Cofferdams**
- **Dewatering / Tremie Placement**
- **Casing**
  - Casing may be removed or remain in place
- **Cross-hole Sonic Logging**



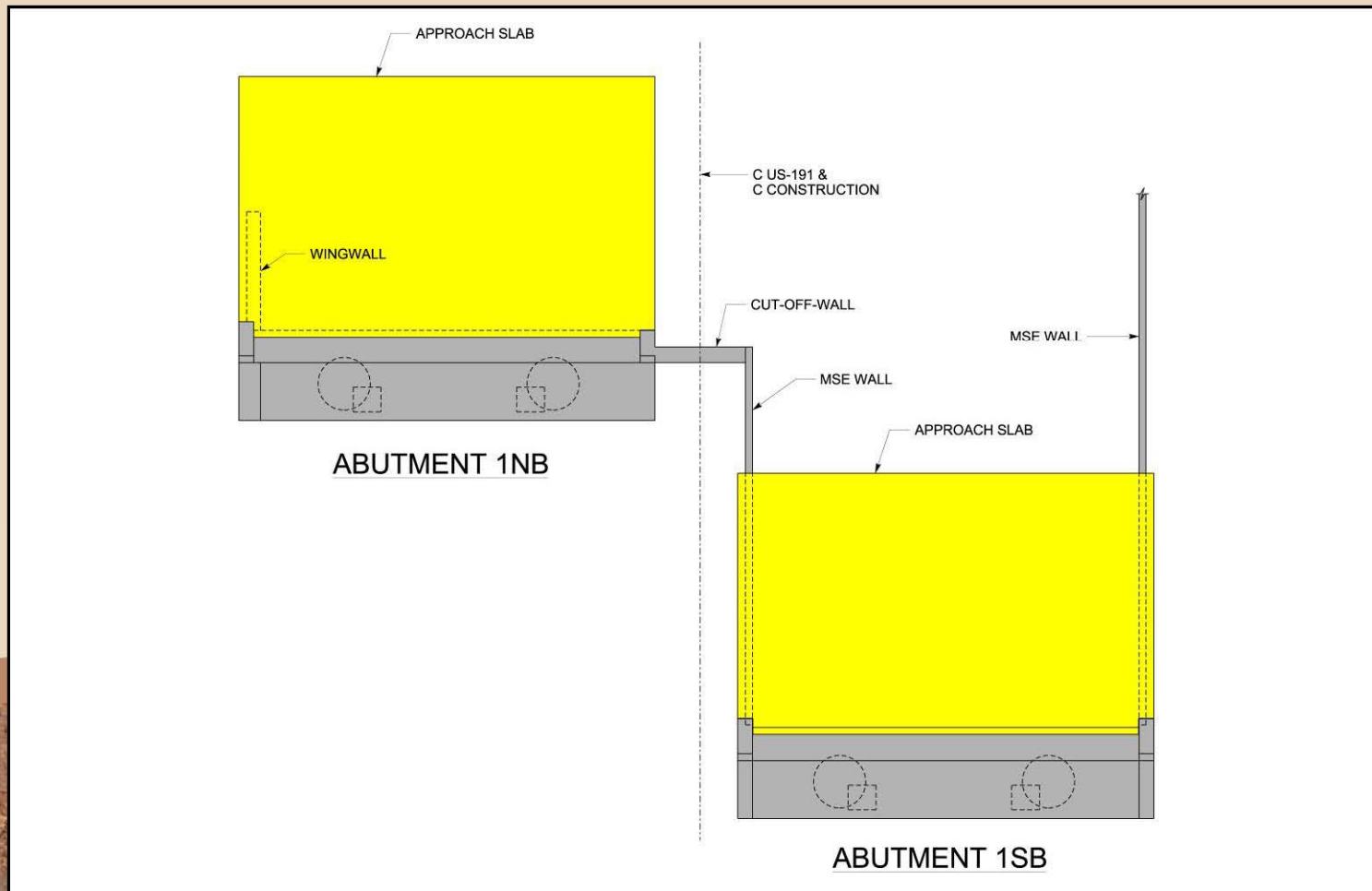


# Footings

- Piers 2 and 3
- 30' x 30' x 8' Thick

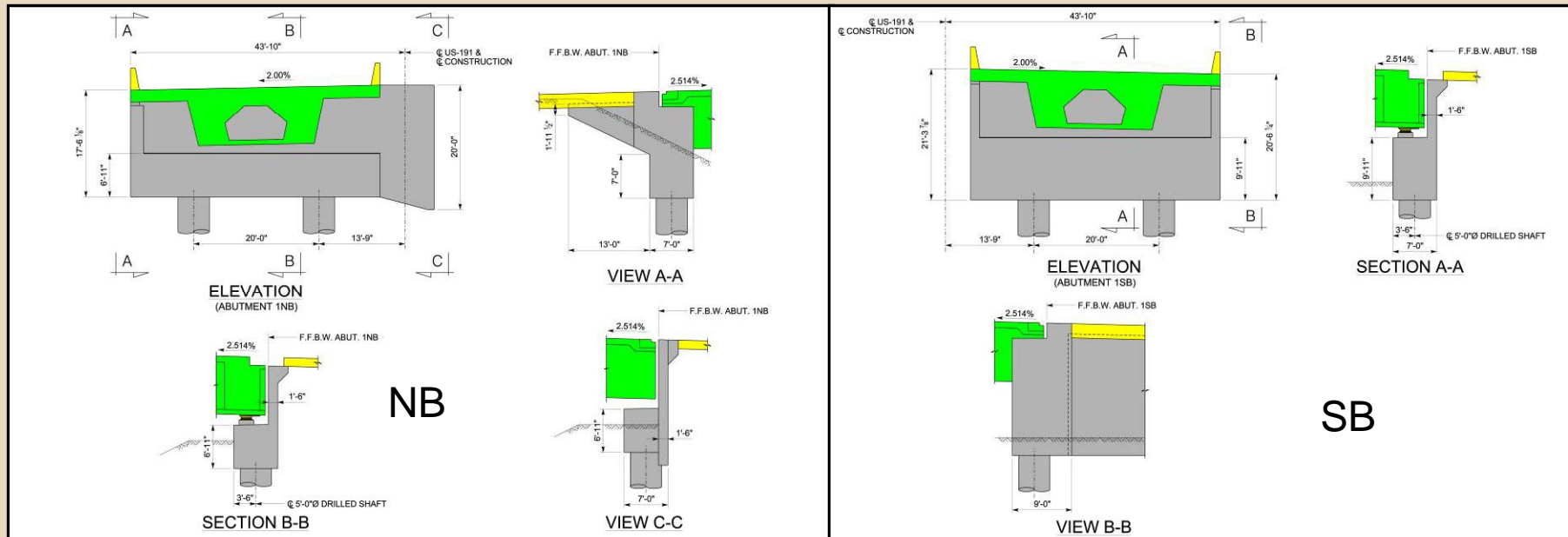


# Abutment 1

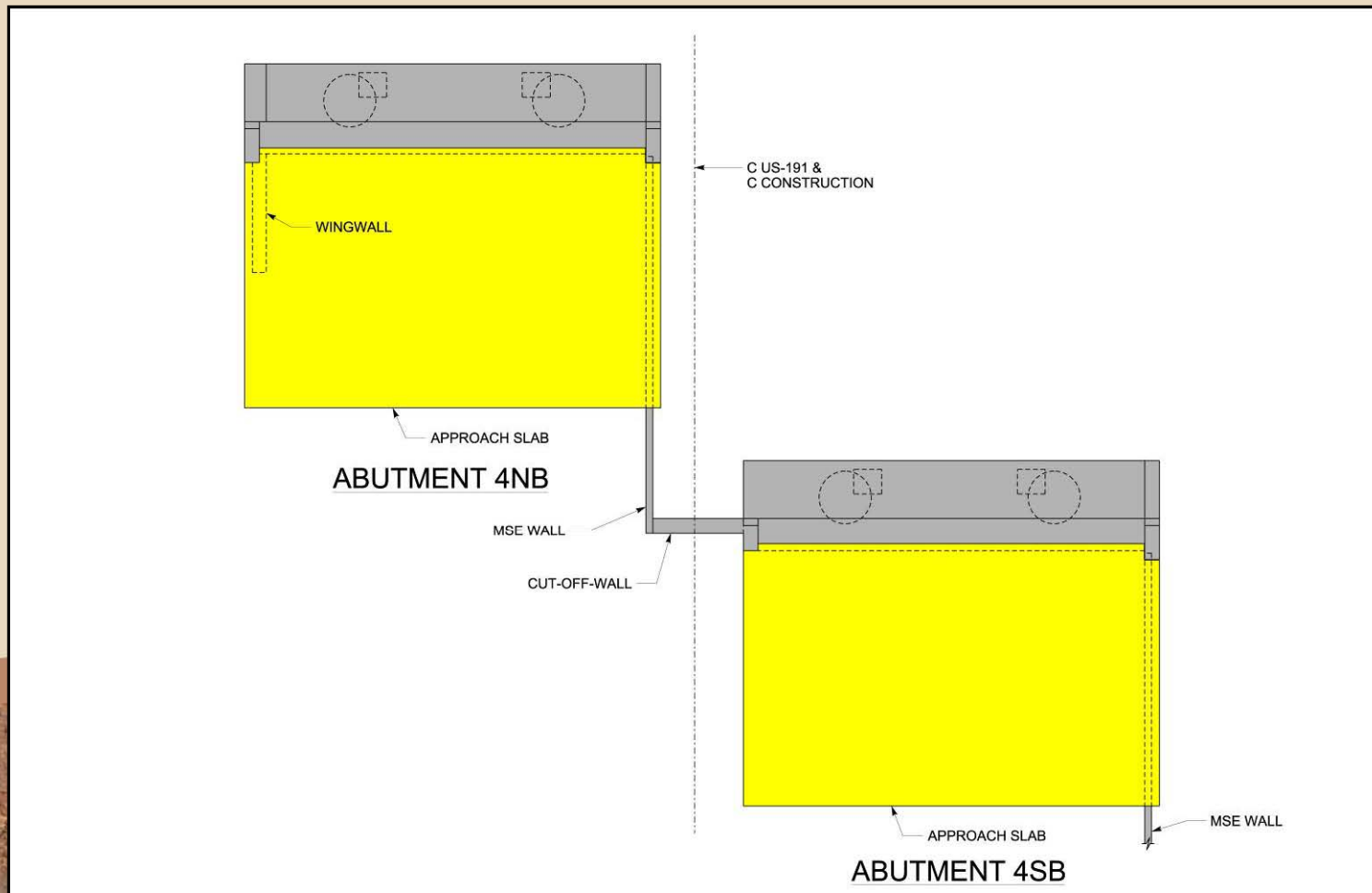




# Abutment 1

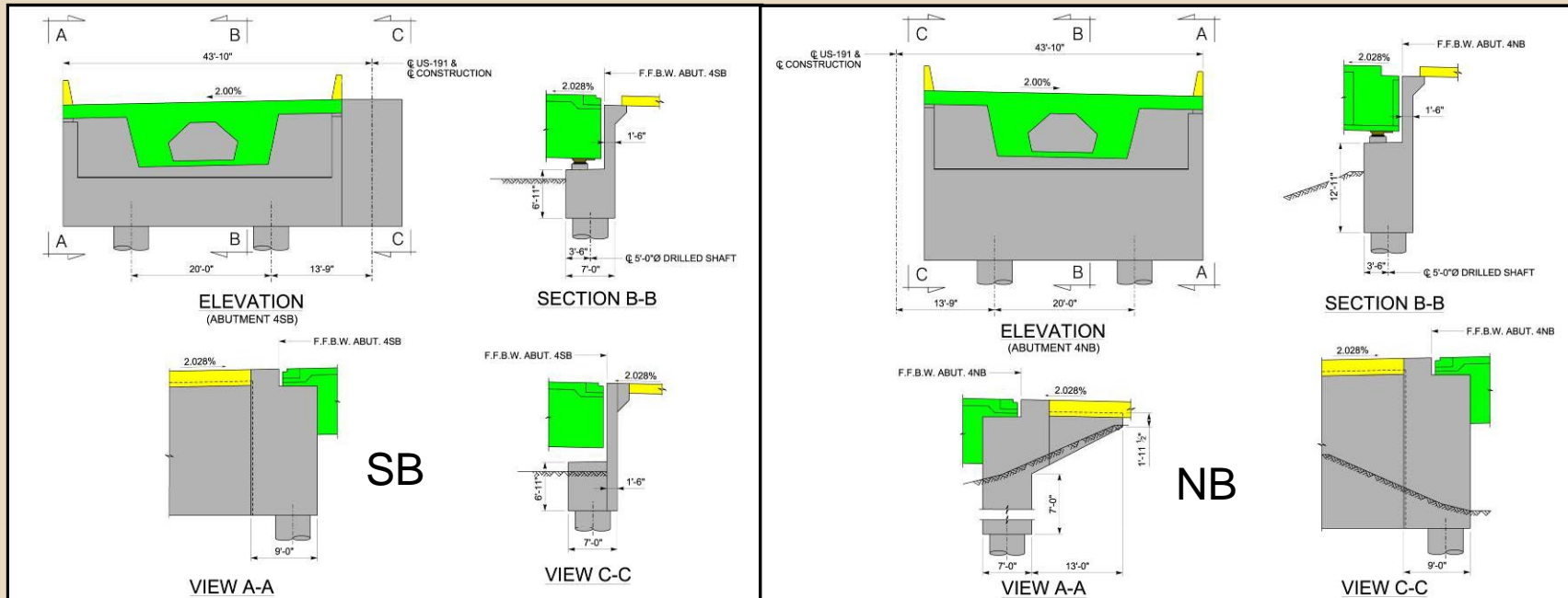


# Abutment 4





# Abutment 4



# Bearings & Joints

- **Piers**
  - Continuous
  - 4 Disc Bearings per Pier
  - Cantilever Construction with No Temporary Works
    - Extreme Event PT Tie Down Bars
  - 4500 kip capacity (factored)
  - Guided, Non-Guided (Pier 2)
  - Fixed (Pier 3)





# Bearings & Joints

- **Abutments**
  - 2 Disc Bearings per Bridge Abutment
  - 1280 kip capacity (factored)
  - Guided and Non-Guided
  - Modular Expansion Joints
    - Abutment 1: 0-12" Capacity
    - Abutment 4: 0-6" Capacity



# Estimated Substructure Quantities

- **Drilled Shafts**

- 7'-0" Diameter

1944 linear ft

- 5'-0" Diameter

651 linear ft

(Uncoated Reinforcing Steel)

- **Footings, Piers, Abutments**

- 4000 psi concrete

2536 cu yd

- Uncoated Reinforcing Steel

222,817 lbs

- Epoxy Coated Reinforcing Steel

321,394 lbs





# Estimated Substructure Quantities

- **Disc Bearings**

- 4500 kip 16 Ea.
- 1280 kip 8 Ea.

- **Stain**

- Piers, Abutments 10,400 sq ft
- Walls 9946 sq ft

- **Other**

- Pier Flowable Fill 709 cu yds
- Granular Backfill Borrow 1012 cu yds



# Superstructure



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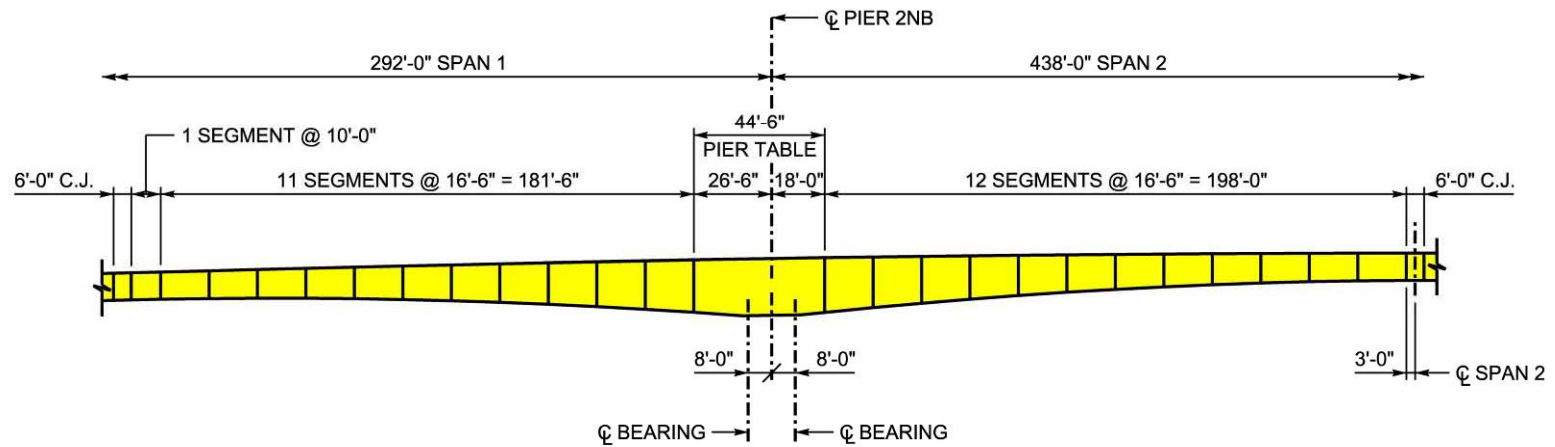


# Superstructure

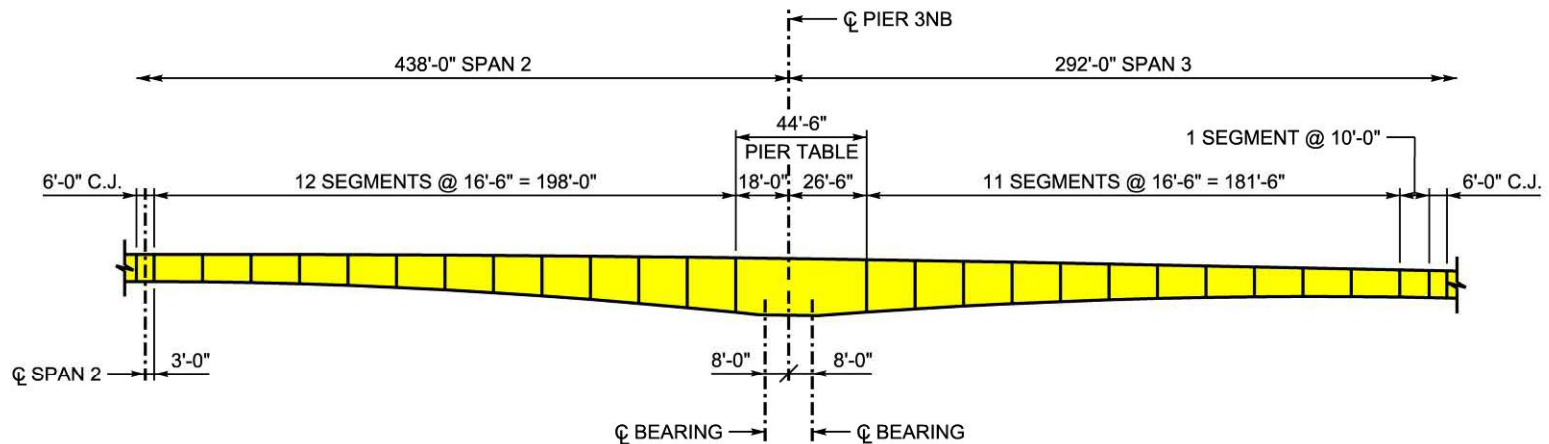
- Trapezoidal Box Girders (w/deck overhangs)
- CIP Post-Tensioned Concrete
- Balanced Cantilever Construction From Above with Form Travelers
- Short End Sections on Falsework



# BC Segmental Layout



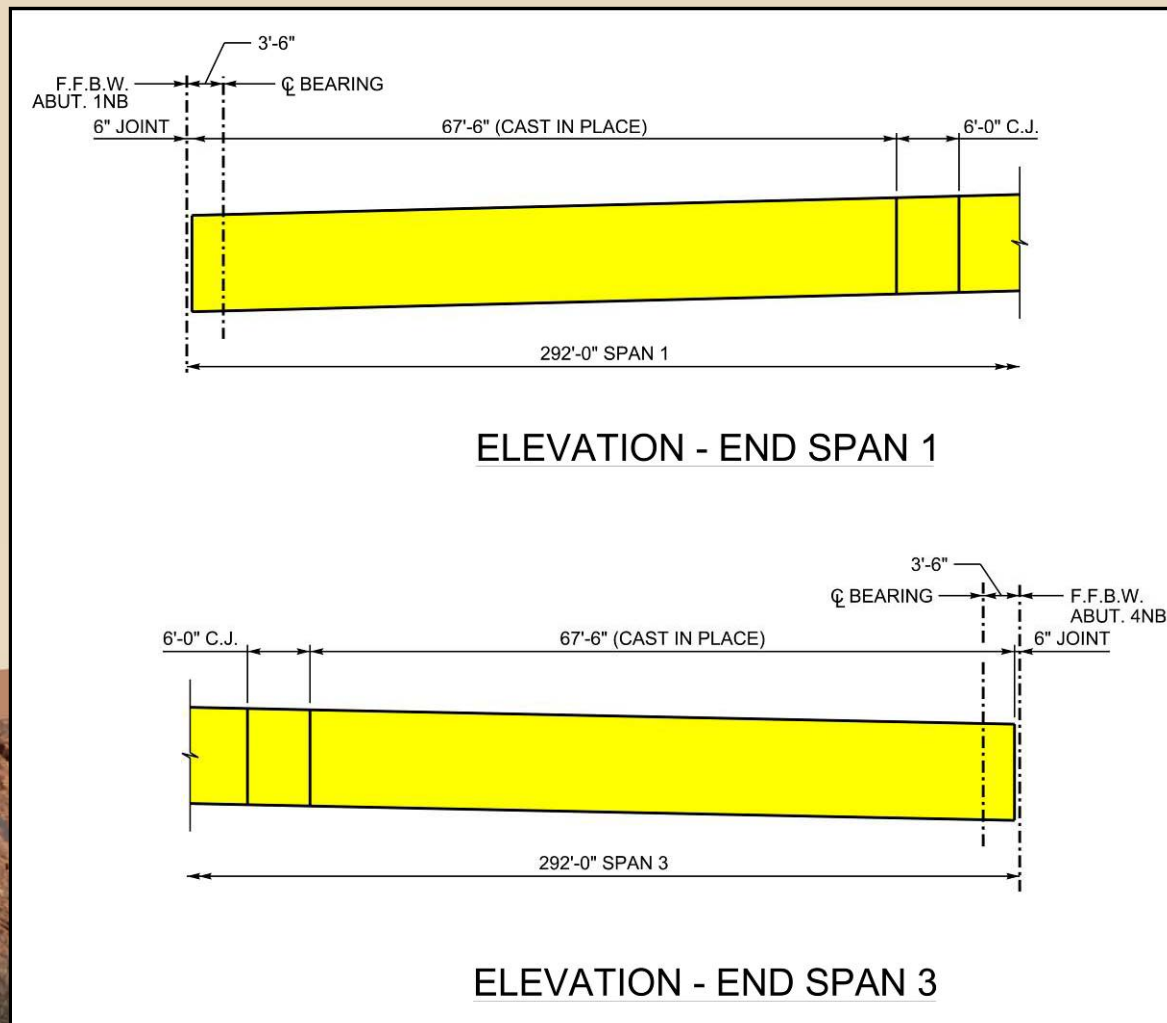
ELEVATION - CANTILEVER 2



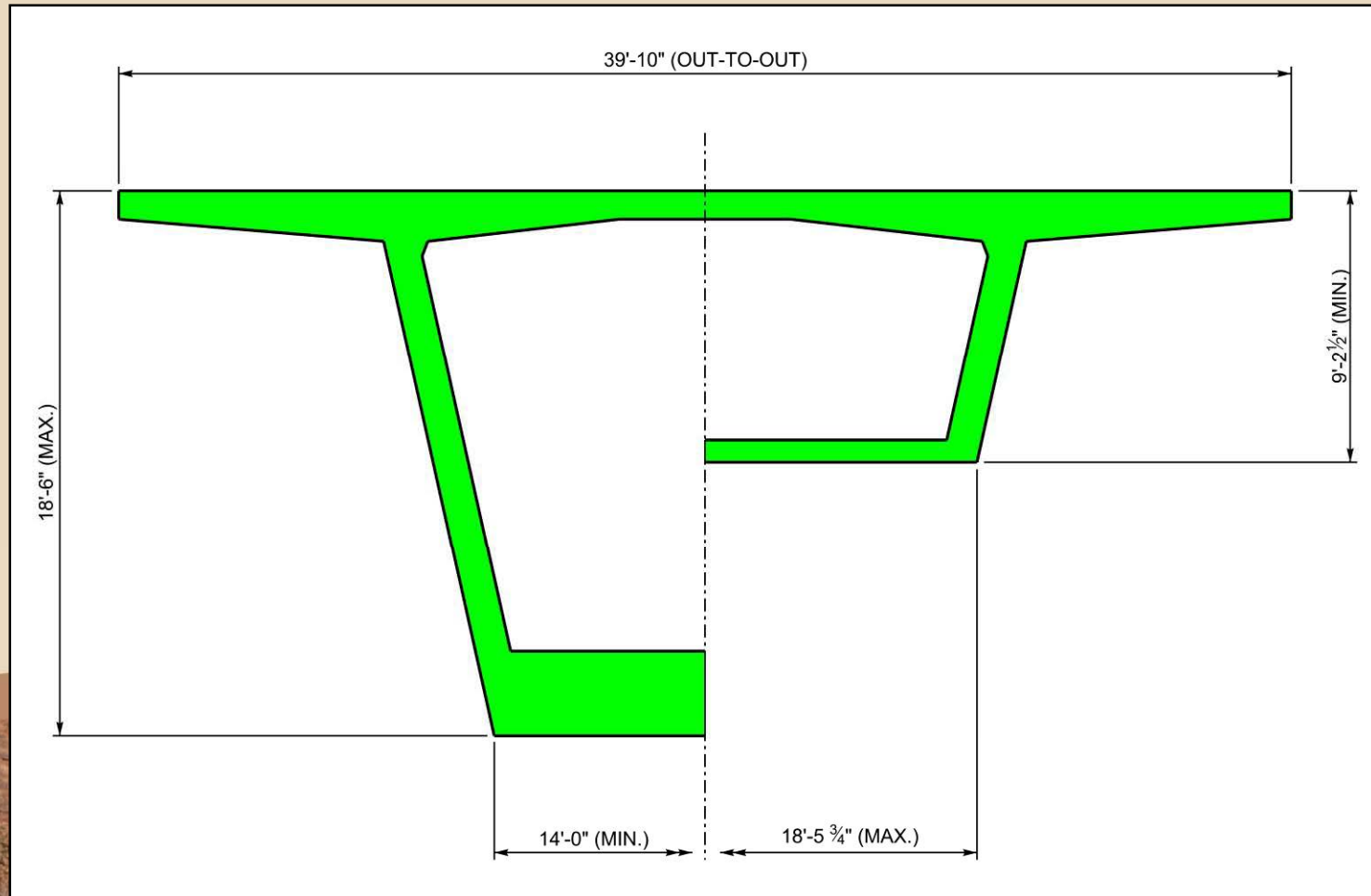
ELEVATION - CANTILEVER 3



# End Sections on Falsework

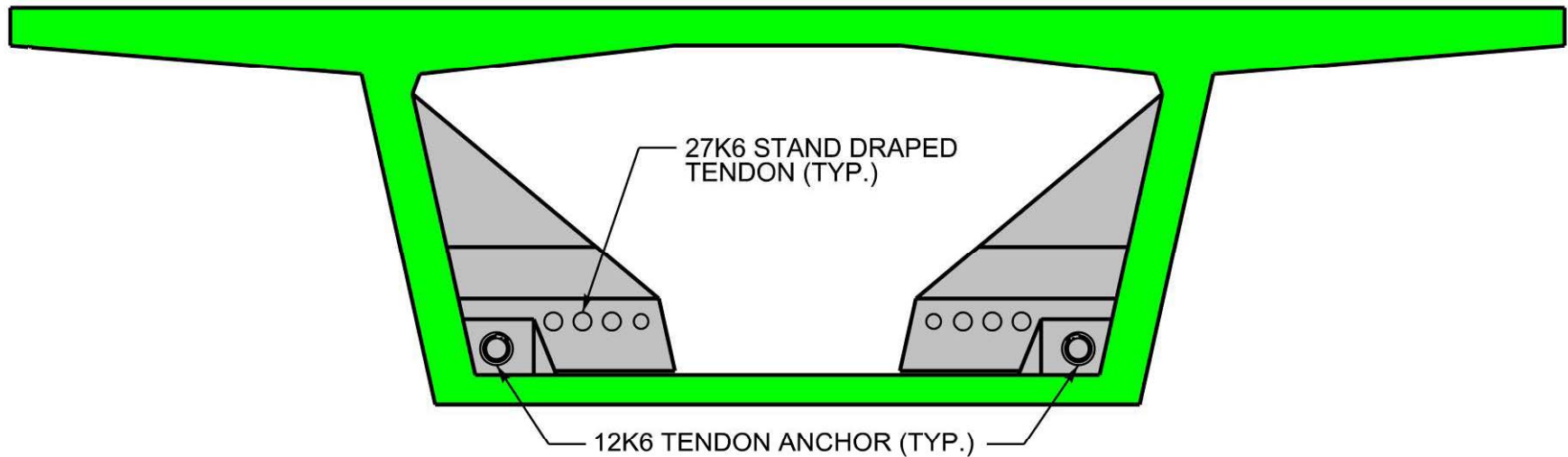


# Typical Section

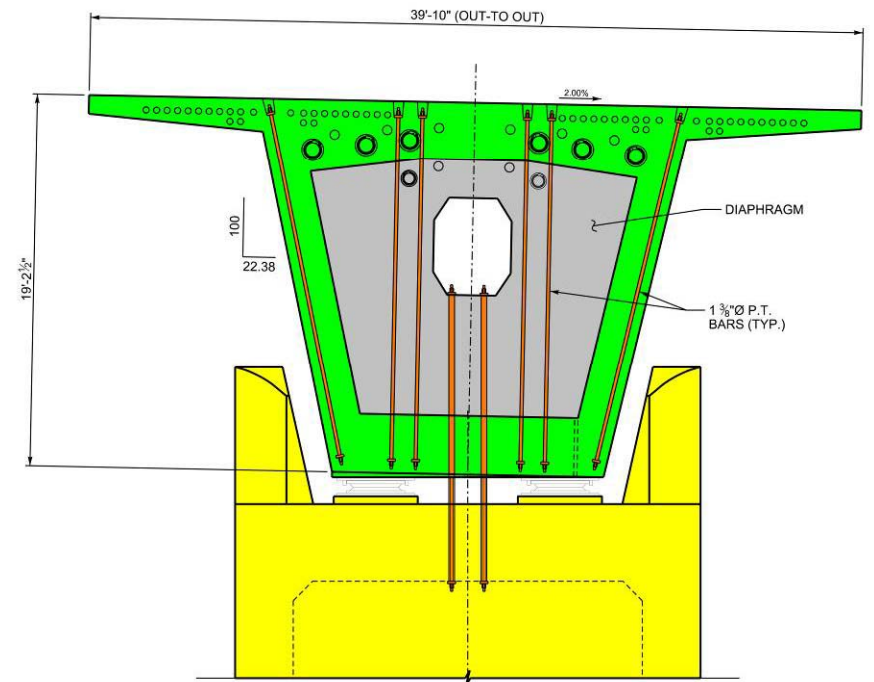
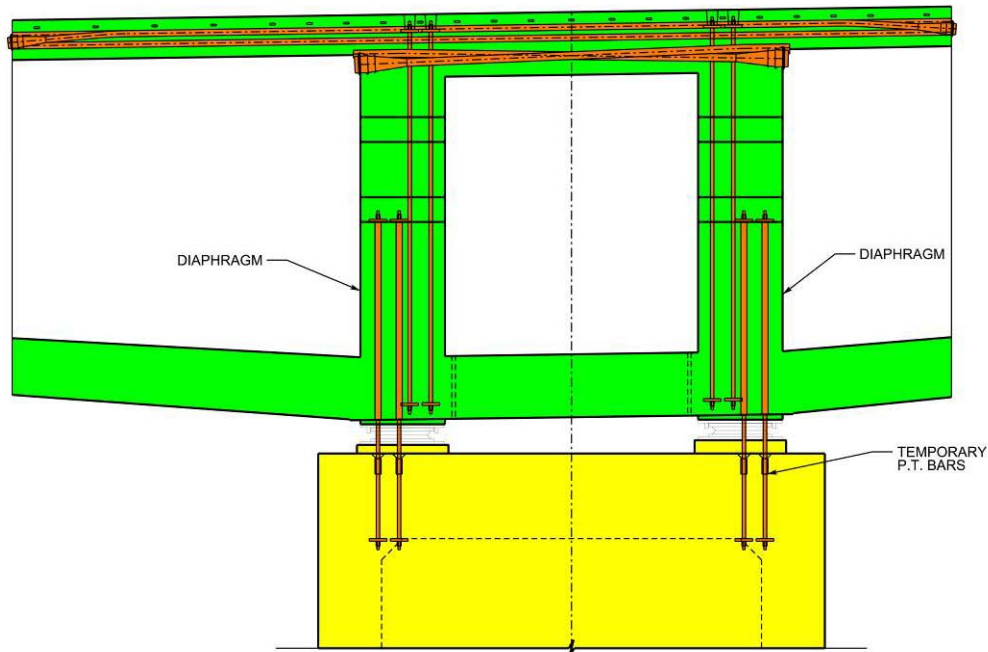




# Tendon Deviators

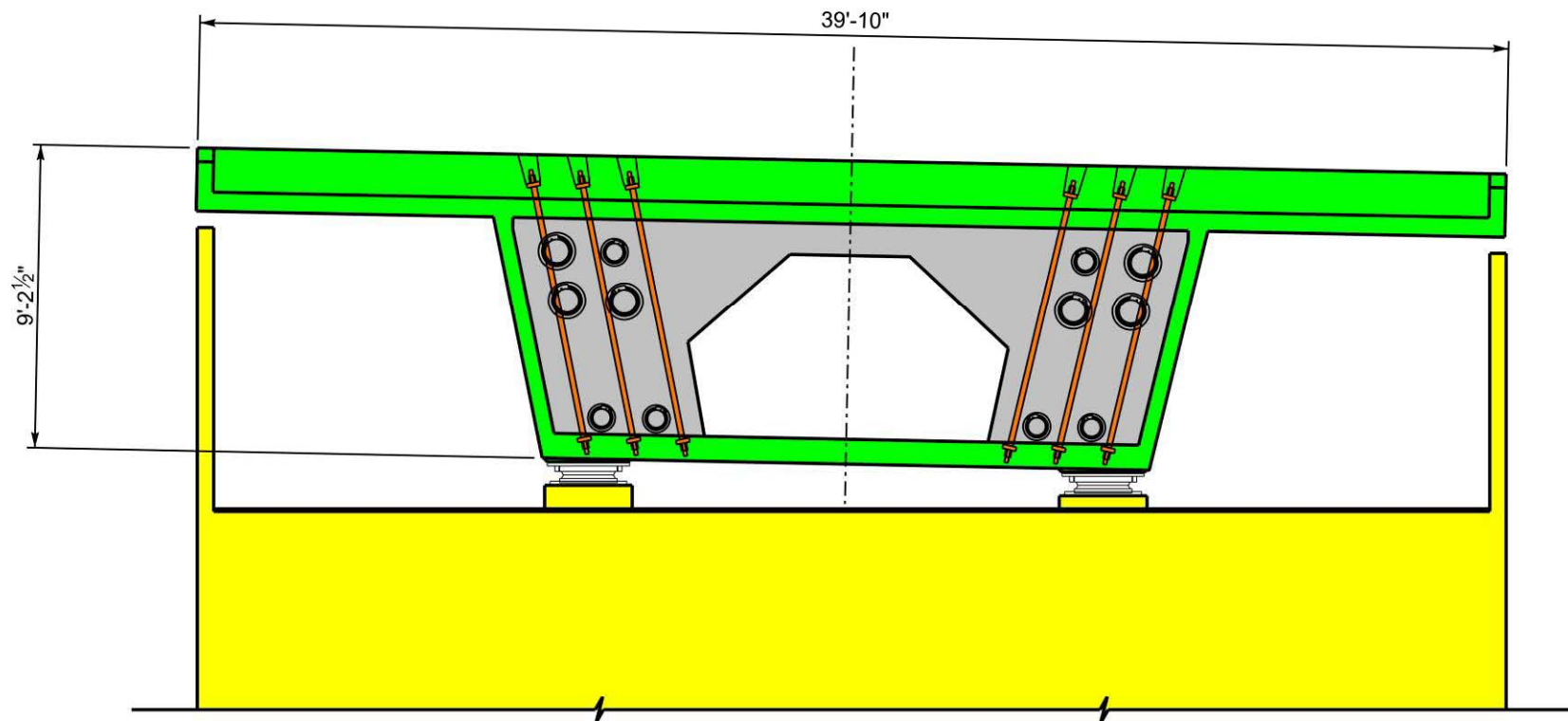


# Pier Tables

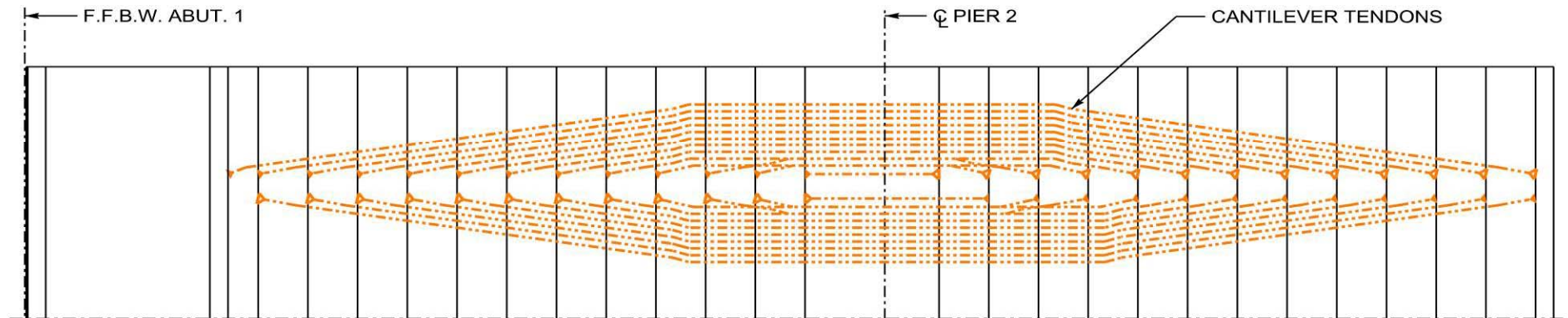




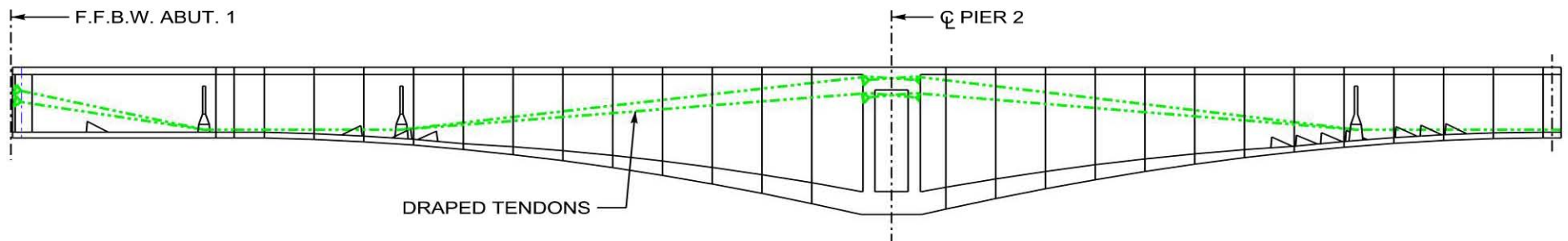
# End Diaphragms



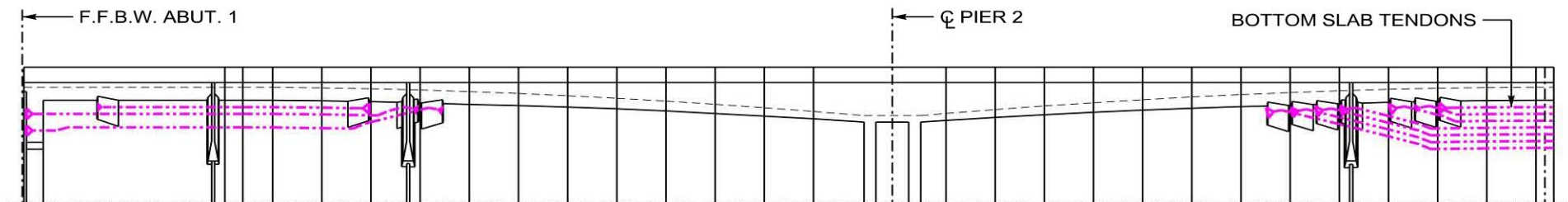
# Longitudinal Post-Tensioning



PARTIAL PLAN - CANTILEVER TENDONS



ELEVATION - DRAPED TENDONS



PARTIAL PLAN - BOTTOM SLAB TENDONS

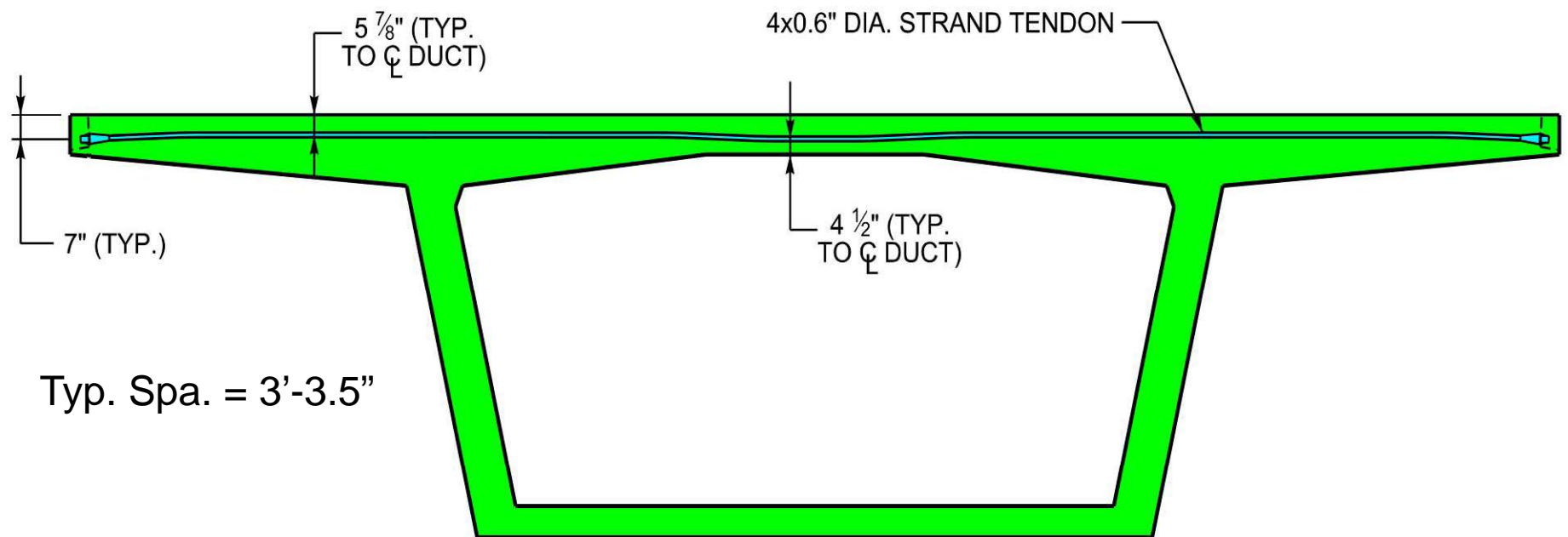


# Longitudinal PT Summary

- **Cantilever Tendons**
  - 12x0.6", 25 Tendons/Web
- **Draped Tendons**
  - 27x0.6", 3 Tendons/Web
- **Bottom Slab Tendons**
  - 12x0.6"
    - 7 Tendons/Web Main-span
    - 3 Tendons/Web Back-spans



# Transverse PT (Deck)





# Estimated Superstructure Quantities

• Concrete (6000 psi)	7911 cu yds
• Concrete (4000 psi) Appr. Slabs	236 cu yds
• Epoxy Coated Reinforcing	1,375,434 lbs
• PT Strand Longitudinal	740,205 lbs
• PT Strand Transverse	75,898 lbs
• PT Bars	11,647 lbs



# Estimated Superstructure Quantities

- |                      |                |
|----------------------|----------------|
| • Bridge Barrier     | 4308 linear ft |
| • Stain              | 139,300 sqft   |
| • Modular EJ (0-6")  | 74 linear ft   |
| • Modular EJ (0-12") | 74 linear Ft   |
| • Bridge Drain       | 12 Ea.         |





# Other Items

- **Stain**
  - Mineral Stain to blend with surrounding environment
  - Applied to all elements above ground line
    - Superstructure, Substructure, Abutments, Walls
- **Form Liners**
  - Rock pattern complimenting canyon walls
  - Piers
  - MSE Wall Panels



# Construction

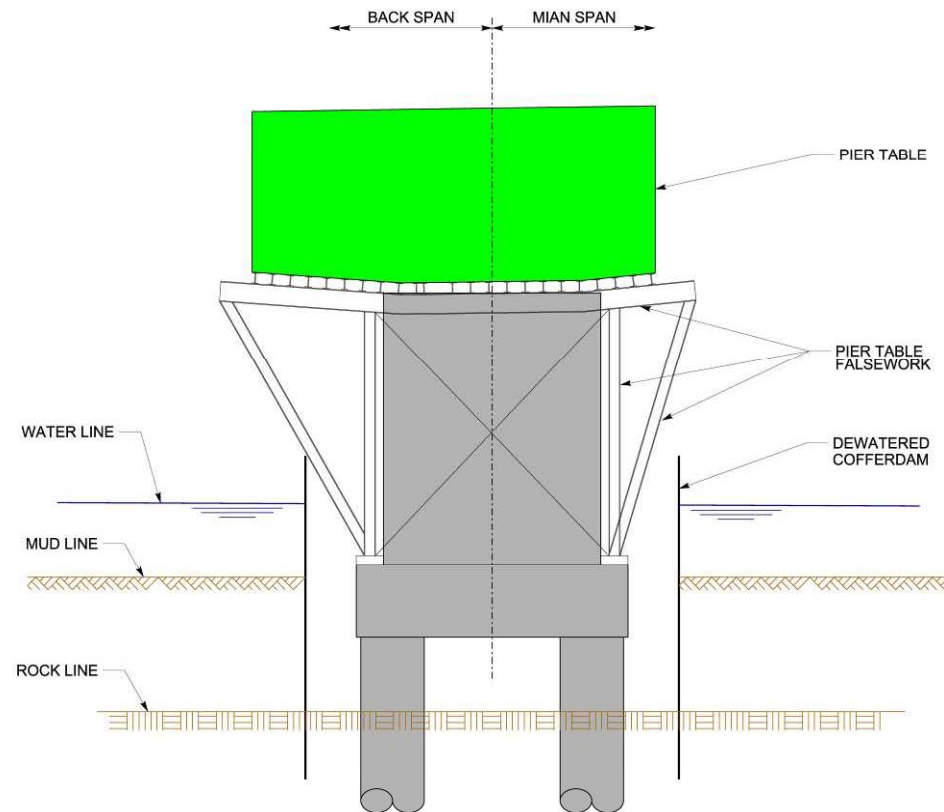


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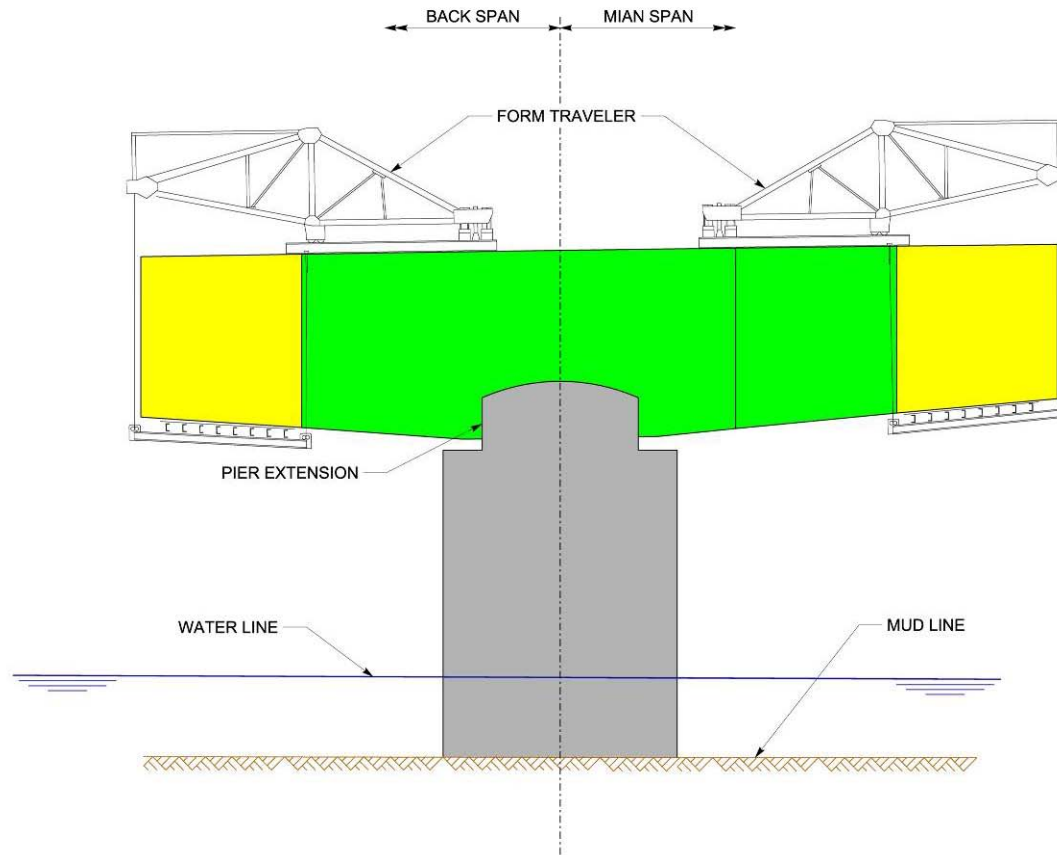
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# Pier Table Construction

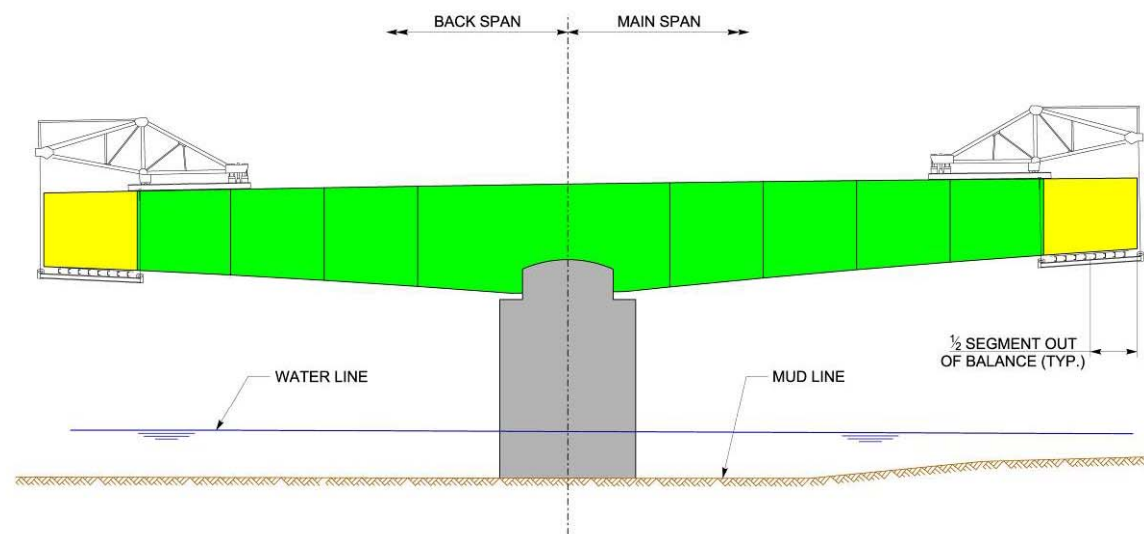


# Traveler Assembly, Segment Casting

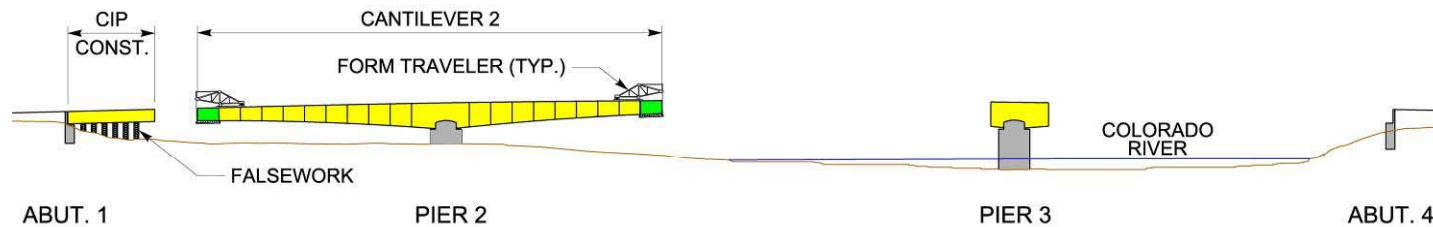




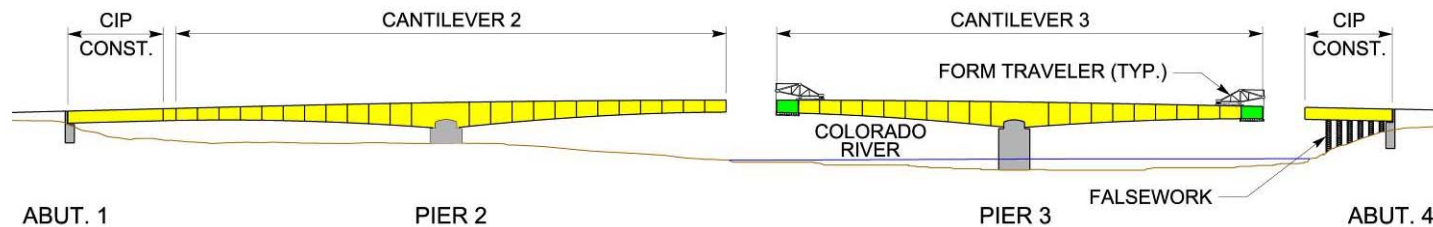
# BC Segment Casting



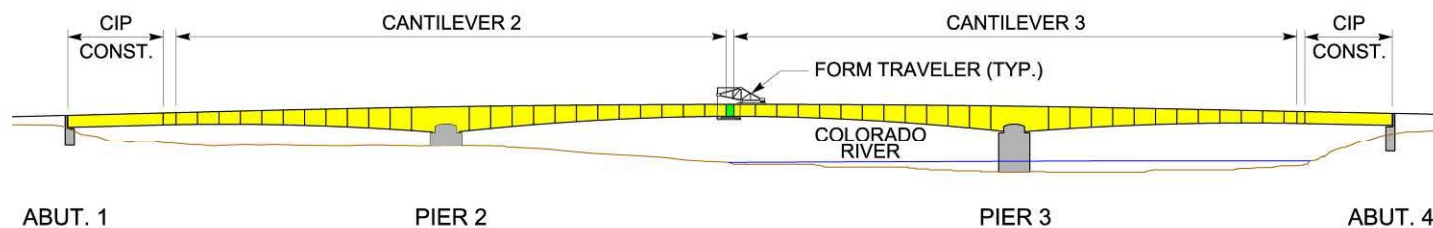
# Construction Sequence



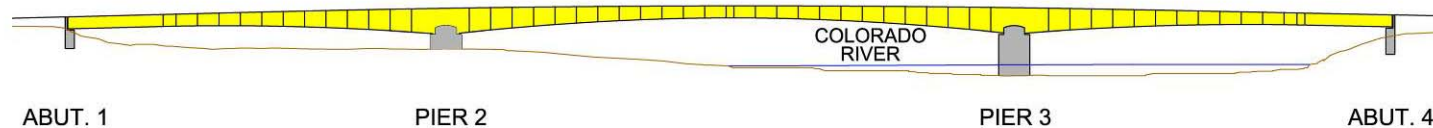
STAGE 1



STAGE 2



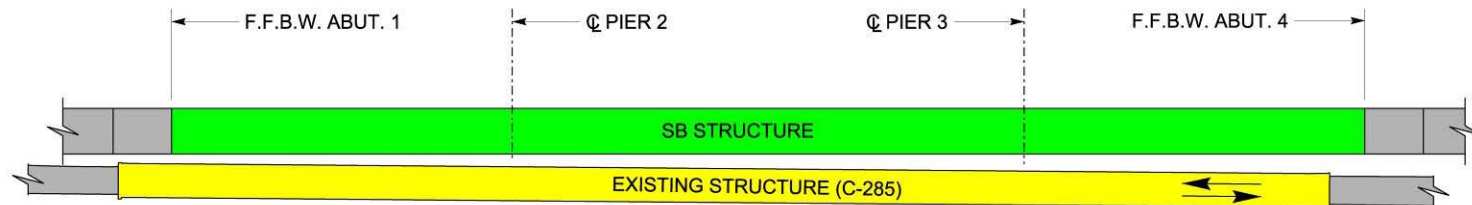
STAGE 3



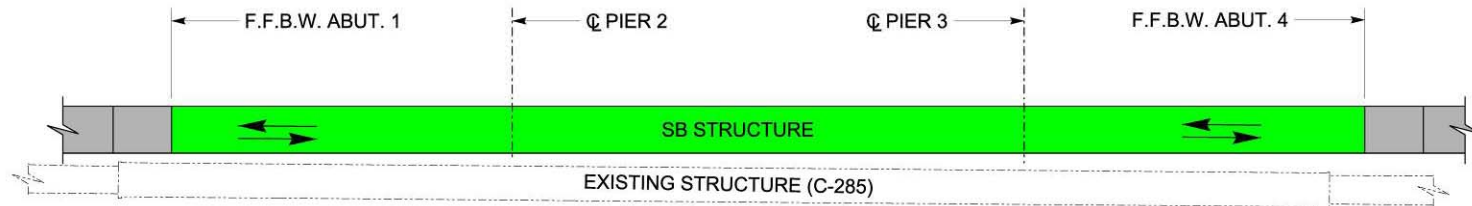
STAGE 4



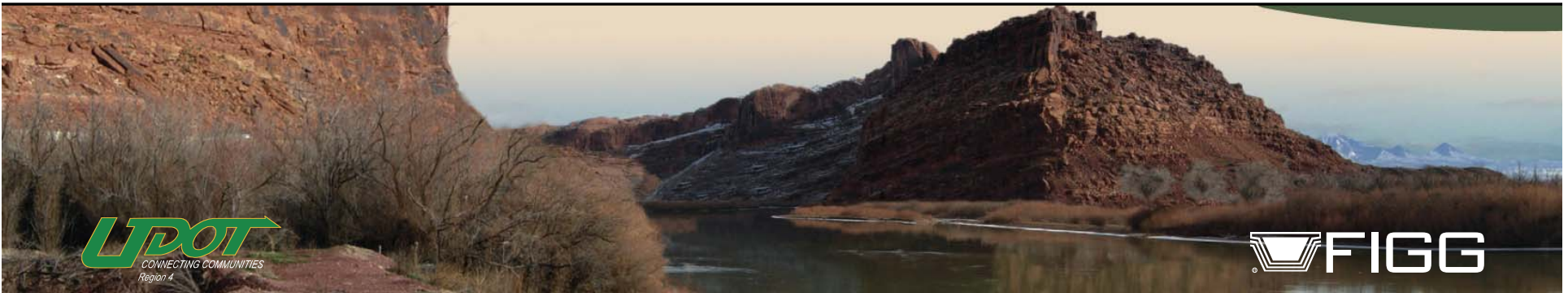
# Construction Phasing



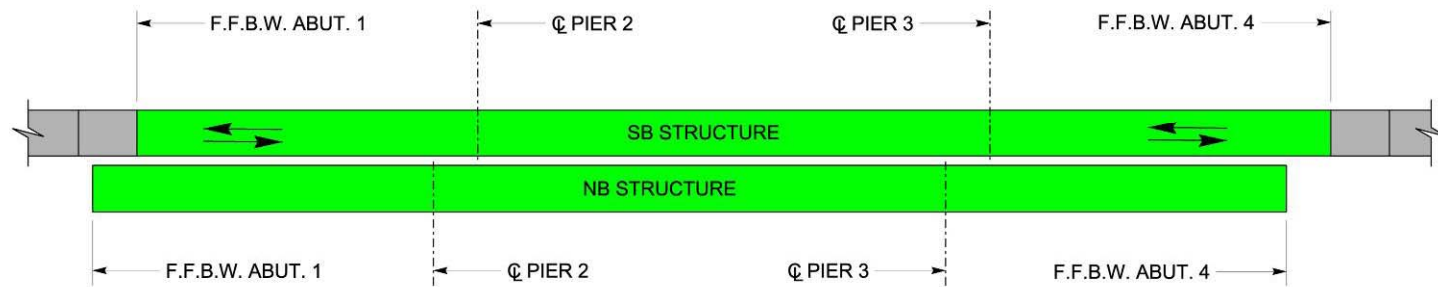
PHASE 1



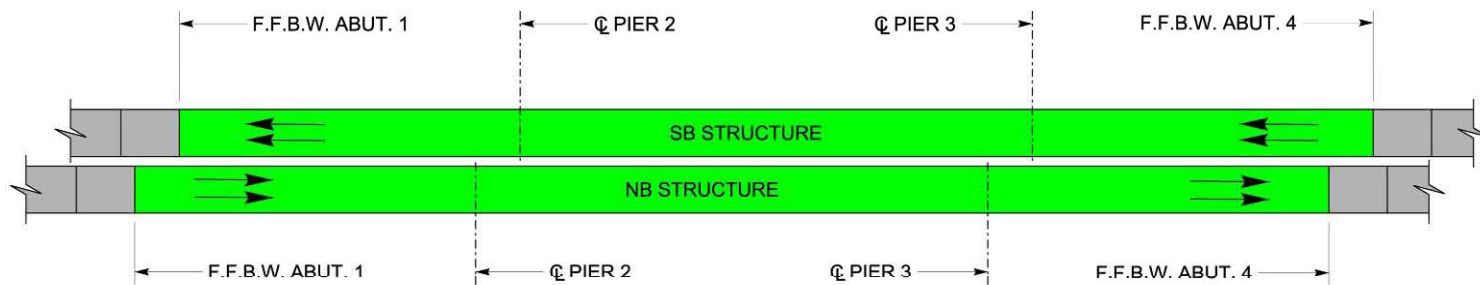
PHASE 2



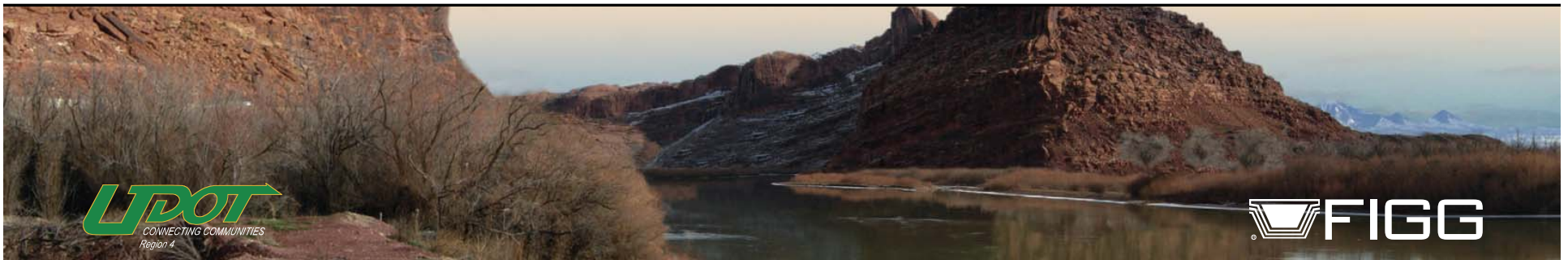
# Construction Phasing



PHASE 3



PHASE 4



# Bridge Removal

- **Superstructure**
- **Abutments (piles to remain)**
- **Approach Slabs**
- **Substructure**
  - Limits shown in Plans
  - Land Piers – 2' Below Grade
  - River Piers – Column & Footing (piles to remain)





# US-191 Over the Colorado River Bridge Replacement Project

Moab, Utah

Questions